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ABSTRACT

This is the third in a series of reports on the activity carried out under Project INFO auspices at Stanford, and covers the period March 1971 - April 1972. During this time, the project has been principally engaged in continued development of the OASIS (Online Administrative Information System) data base management system and its implementation at Stanford in four major application areas; Student, Alumni/Gift, Employee, and Budget. The major objective of Project INFO is the design and testing of an integrated computer system for university administration. Of major importance during the reporting period was the award of a renewal grant by the Ford Foundation to continue the work of the project through August 1973. The work of the OASIS development team in the period since the last progress report has focused on completion of a number of system features not present in the prototype version, on adapting OASIS to new application requirements as they have become known, and on preparing for and supporting the installation of OASIS at two sites: The University of Vermont and Sherbrooke University. Appendixes include: Network Programing Techniques, Dissemination Activities, and OASIS Data Element Dictionaries. (Author/PG)

ED 090827

THE DESIGN AND TESTING OF AN INTEGRATED COMPUTER SYSTEM FOR THE ADMINISTRATIVE PROCESSES OF THE UNIVERSITY

PROGRESS REPORT

APRIL 1972

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HE 005 421

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Student
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SECTION 1 - INTRODUCTION

This is the third in a series of reports on the activity carried out under Project INFO auspices at Stanford, and covers the period from March 1971 through April 1972. During this time, the project has been principally engaged in continued development of the OASIS (Online Administrative Information System) data base management system and its implementation at Stanford in four major applications areas - Student, Alumni/Gift, Employee, and Budget.

The major objective of Project INFO is the design and testing of an integrated computer system for university administration. Significant milestones in the course of the project to date have been the adoption of a design for a Stanford developed data base system in early 1969; prototype operation of the system, now known as OASIS, in October 1970; creation of online files for the first three application systems in January 1972; and implementation of the OASIS Student Records and Registration system during the Spring Quarter, 1972.

Of major importance during the reporting period was the award of a renewal grant of $190,000 by the Ford Foundation to continue the work of the project through August 1973. These funds will contribute to application development and provide for an active program of external dissemination of OASIS, applications developed at Stanford, and reports on its performance and economics. Additional background material on Project INFO and the scope of current activity is contained in Appendix V.

The work of the OASIS development team in the period since the last Progress Report has focused on completion of a number of system features not present in the prototype version, on adapting OASIS to new application requirements as they have become known, and on preparing for and supporting the installation of OASIS at two non-Stanford sites - the University of Vermont and Sherbrooke University in the Canadian Province of Quebec. Additional detail on OASIS is provided in Section 3.

In order to provide appropriate managerial direction for the first four systems to be put into operation at Stanford using OASIS, formal responsibility for the final design, programming, testing, and con-

version of each application was assigned to the Systems Development Group, another part of the Management Systems Office in which Project INFO is located. A detailed presentation of applications work is contained in Section 2 and the Appendix.

An active program of external dissemination has been continued. One volume of OASIS system documentation, dealing with Application Programming techniques, was published in August of 1971. The OASIS Newsletter, an informal means of communication of OASIS developments, is now being published each calendar quarter and distributed to a mailing list of approximately four hundred. An OASIS Workshop was held on the east coast at the Massachusetts Institute of Technology at the end of October 1971. A total of seventy-seven individuals from a variety of higher education organizations attended the two day sessions. Additional material on dissemination is contained in Appendix II. The condensed proceedings of a panel on university MIS planning which was held at M.I.T. during the October workshop can be found in Appendix III.

As application systems designs have proceeded toward actual implementation, there has been a continuing evolution in the file contents and layout. Because of the data base aspects of OASIS, in which reference to data elements is essentially divorced from their physical location and representation, changes to the files have been able to be made with minimal impact on the system development and programming process. Current data element dictionaries for three OASIS systems--Student, Alumni/Gift, and Employee - are contained in Appendix VI.

SECTION 2 - APPLICATION DEVELOPMENTS

2.1 Background

In the last several years, application development and maintenance responsibilities of the Systems Development Group have increased rapidly in scope and level of complexity, mirroring similar developments in the University administration generally. At the end of 1971, a staff of 25 was occupied with support for more than 40 separate applications of varying sizes. The addition of implementation responsibilities for the four major INFO application systems in March 1971 added substantially to the workload of the group and emphasized a need for a more formalized procedure for systems development. After several man-months of effort by senior staff members in SDG, a set of procedures was developed which are known as DIP (Design and Implementation Plan). The objectives of the plan are to:

- Provide a consistent approach to solving systems problems
- Detail the organization and content of system documentation
- Produce documentation as a by-product of development effort
- Facilitate transfer of maintenance between SDG staff members

The DIP procedures were adopted for all SDG work in progress in late 1971, and will be used for all new work in the future, including OASIS applications. A detailed description of the techniques employed is contained in Appendix IV.

2.2 OASIS Application Design Considerations

Experience to date in the development of OASIS based system designs has isolated certain areas which are common to all applications. The following material is provided for the benefit of others who may be working on data base oriented system designs.

(1) File Conversion

Files for data base systems are generally created by converting and merging information from multiple files that have been maintained separately for several years. An example of this is the OASIS Alumni/Gift file, which is derived from (1) an Alumni Master

(2 reels/tape), (2) Gift Master (2 reels/tape), (3) Special Interest Volunteers (1 reel/tape), and (4) Pledges (disc).

Prior to creation of the OASIS source tape the data must be organized into logical segments. Some considerations in the design of the file are:

a) Related data should appear in the same segment
b) Segments are organized by security
c) Segments are short enough in length to permit 'GETSEG' file services in online programs which do not require an I/O area of excessive length.

The original Alumni/Gift file was created by program using the three tape files. The Pledge file was added immediately afterward from card input.

The program to create the OASIS Source tape from the three input tape files required nearly a man year of programmer effort. New definitions of fields required complex condition checking among and within the various input files.

The Alumni/Gift file is sufficiently large (initially 158,253 records) that for testing purposes a file of 1% of the records was created. Reports from previous systems were created from these 1% files and were used for conversion validation and program testing. In the case of maintenance programs, the file can be restored without excessive cost and in the case of file retrieval, individual program tests take but a few minutes of machine time. No program performing maintenance functions is used against the full file until thoroughly tested with the 1% file. Statistics on the full file are contained in the Alumni/Gift system description on page 14.

On the 370/145 the creation of the source input tape for OASIS required 16 hours. Processing of the input tape to create disc data areas and index tables required an additional five hours. These figures represent worst case statistics for Stanford applications, in that the Alumni/Gift file is twice the size of the next largest OASIS file and approximately three times the size of the average file expected to be

used at Stanford. The entire file creation process for the prototype Employee Data file currently requires two hours of machine time.

(2) Methods of Transaction Entry

Three methods of transaction entry are available under OASIS - direct update from the terminal, deferred update using the terminal for data entry, and card input to batch programs.

a) Direct Update: This method provides for entry of each transaction from the terminal and execution of the complete processing cycle on the data as it is entered, usually including the following:

- editing of transaction data for both field errors and against the master file for logic errors
- error signaling to terminal operator and immediate correction and resubmission of erroneous data
- permanent change to file contents
- logging of transaction data to system logging file for backup/restart/audit trail purposes

b) Deferred Update: Transactions are entered from the terminal under the control of an online program which does basic field editing and creates a temporary disc or tape file, that subsequently becomes input to a batch processing file update program. Under this system, input can be accumulated for days, or several weeks, so as to make only one pass at the file, but transactions which reject when processed against the master file must be printed out on a list and resubmitted later.

c) Card Input: This is the traditional approach of conventional batch systems. Data is normally coded on forms, the forms are keypunched, the cards are passed against the master file with either the cards rejected themselves in case of error, or a printed list of errors created, and the errors rekeypunched and reprocessed.

In comparing these three methods, the following criteria are important:

a) Reliability: All three methods are reliable, assuming that the system is designed to employ adequate checks and controls on the data and to provide adequate recovery procedures if something goes

wrong (e.g., hardware, program, or operations error). Recovery techniques for the direct terminal method might be somewhat more expensive than for the other methods, as a file rebuild may be necessary under the direct method.

b) Error Handling: Under the card method, all errors must be corrected from a reject list, and data resubmitted to keypunch. Because the data is both coded and keypunched, the chance for errors existing in the data is greater with card input. Under the deferred method, some errors will be noted at entry time and correction allowed, but others will appear on a reject list, causing the user to again study the transaction and resubmit it. Under the direct method, all errors will be corrected through the terminal before the transaction is processed, so there will be no reject list requiring a second look at data and resubmission of it.

c) Timeliness: The direct terminal method provides by far the best facility for keeping the file information accurate on a day-to-day basis. All information submitted immediately updates the file and is therefore immediately available for inquiry, and there is not the sometimes troublesome delay in getting rejected data onto the file. However, some of this timeliness is lost if a single day's data cannot be entered in a single day through the terminals in the user area. The projected transaction volume for example, in the Alumni/Gift system is a maximum of 200,000/year or approximately one a minute on two terminals, which implies that this will not be a problem, except possibly at peak-volume times such as the spring addition of new graduates. The card input backup method could be used to take up any overload generated at peak-volume times.

d) Programming Effort: This is the area in which the implied preference shown above is reversed. A card input method would take the least effort. It is to be provided as backup to either terminal method in any case. The queued input method would require less effort than the direct, in that data is processed in "batch" mode rather than in "online" mode.

The latter requires the program to be segmented into 2K modules, whereas the former allows for a 90K program which is the batch design point. It is estimated that the transaction processing program for queued mode would take about 25% more effort than the card method, and the direct about 50% more effort than the card method.

Production Cost: The direct method is the least expensive production method for update, because all update is done through the terminal and does not generally require coding of input sheets and key-punching. In the other methods, however, batch processing at night would be an expense that must be considered.

(3) Modular Programming

Since the work on application programming for OASIS online services was first reported in the February 1971 Progress Report, additional effort has been expended to obtain greater efficiency and better use of memory. An extensive discussion of the techniques now in use is contained in Appendix I.

(4) Training

With increasing levels of systems sophistication, training becomes an essential ingredient of both specific application developments, as well as part of the daily activity of the systems group itself.

A formal training program has now been established for all SDG personnel, with emphasis in the following areas:

a) Computer systems fundamentals
b) ANS COBOL
c) Systems analysis training
d) Job Control Language
e) Testing and debugging
f) Modularization

These courses have been conducted inhouse utilizing video tape medium and have been accompanied by expanded standards and guidelines. Accompanying the courses were tutorial sessions in specific OASIS concepts, including QUERY, Report Generator, and Debugging.

Although user education has been kept on an informal basis, organ-

ized class sessions have been conducted for user personnel at all levels. The groups are normally divided into Management/Supervisory and Clerical/ Secretarial, since there would be a slight change in emphasis between the two groups.

Sessions last one to two hours, and the class size is limited to 5-6 persons. OASIS user training is currently conducted in four phases: (1) Orientation; (2) Terminal instruction for Retrieval/Query; (3) Terminal instruction for online maintenance; and (4) special followup. Individual assistance subsequently is provided as necessary.

The following outline indicates the general nature of the material presented in each training sequence.

Management Series

1) Development of formal training plan for non-management personnel
2) Description of elements of final data base and expansionary aspects of the data base
3) Development of alternate reports, discussion of Terminal use and how to use the system as an effective management tool
4) Discussion of conversion and implementation of system and the impact upon office operations
5) Teach mechanics of Terminal use for simple Inquiry
6) Discuss documentation and procedures manuals
7) Interview individual managers to help them define their reports and show them ways to use the system for their specific need.

Secretarial and Clerical Series

1) Description of data base and how information is related to their present information files
2) Develop manual drafts and do general training into techniques of terminal use
3) Full discussion of conversion and its impact upon their office routine
4) Full discussion of the impact implementation of the system will have on present office methods and procedures
5) Demonstration and training in mechanics of Terminal use

6) Discussion of Coding slips and batch process routines
7) Discussion of final drafts of maintenance and procedures manuals
8) Special help to those persons who will be responsible for supervisory duties to provide the office with full input-output services, both online and offline.

2.3 Summary of Application Progress

Project INFO application development currently includes four major systems - Student, Alumni/Gift, Employee, and Budget. A brief description of the scope and status of each is contained in the following pages.

Although the designs for the four systems may appear to be independent, there has been extensive consultation and coordination among the project teams where functional areas or file contents overlap. Each system has an "owner," who is the administrative officer with primary operating responsibility for the functions which the system is performing. In a number of cases, the new OASIS systems are cutting across traditional organizational boundaries, e.g., payroll and personnel, and this is requiring certain accommodations from a staffing and job responsibility standpoint. Another feature of the new systems is that there are "users" in addition to the staff associated with the "owner." Primarily these are planning, analysis, and budget personnel who require access to the data base for information to satisfy study assignments in their own groups. Provision is being made in system design and security procedures to provide the greatest possible level of immediate access to information for planning and analysis without compromising the confidentiality of data in the files.

In OASIS systems, the logical file organization is created to meet functional objectives of the system, including processing efficiency, confidentiality of data, etc. Data capture and validation become and remain the primary responsibility of the system owner. This approach is taken because in most cases, only the system owner is completely knowledgeable about the correctness of file contents. Very seldom do staff analysts or members of the computer group know whether a given

data element value is right or not. However, responsibility for the physical integrity of the data base lies with the Data Base Manager, who is part of the computer facility staff. His duties include building files, maintenance of the file dictionary, disc drive assignments for the files, backup/restart procedures, and assignment of passwords.

The following pages contain information on the four systems on which work is currently scheduled. The priority for implementation is (1) Student, (2) Alumni/Gift. (3) Employee, and (4) Budget. Data Element Dictionaries for the first three systems are contained in Appendix VI.

Student Record System - Narrative Description

The system enables the Registrar to maintain records for a student body of 12,000 so that they are current, accurate and available for analysis. The major processes supported are: Registration, Fee Assessment, Course Enrollment, Grade Processing, and Compilation of Reports, Directories, Roster.

Inputs (i.e. file changes or additions) originate on preprinted forms that are either entered online or keypunched for batch input depending on the volume and the time within the quarter. Regular weekly runs are normally sufficient to process batch input transactions. Additional runs are required during registration and grade processing. Also, throughout the quarter, unscheduled changes to the file (about 100 transactions per day) are introduced through the terminals using tailored program networks. Impromptu requests for counts or selected lists are handled directly using QUERY.

Offices contributing data or participating in its use are the Registrar's Office, the Admissions Office, the Dean of Students Office, the Academic Information Center, the Academic Planning Office, the General Secretary's Office (alumni records), and the Accounting Office. To continue the usefulness of the information beyond student days, portions of the records of departing students are routinely extracted for addition to the alumni file.

The system is being implemented during Spring Quarter 1971-72, and is expected to be operational by the end of this academic year. Additional development to meet specialized reporting and analysis requirements will continue in the future.

STANFORD'S OASIS STUDENT RECORD SYSTEM

SCHEMATIC

REGISTRAR

File Maintenance:
- Addresses
- Courses
- Grades

Information Retrieval & Reporting:
- QUERY and TRG
- Tailored Networks
- Batch

ACCOUNTING:

File Maintenance:
- Fees

Information Retrieval & Reporting:
- QUERY and TRG
- Tailored Networks
- Batch

HOUSING & DEAN OF STUDENTS

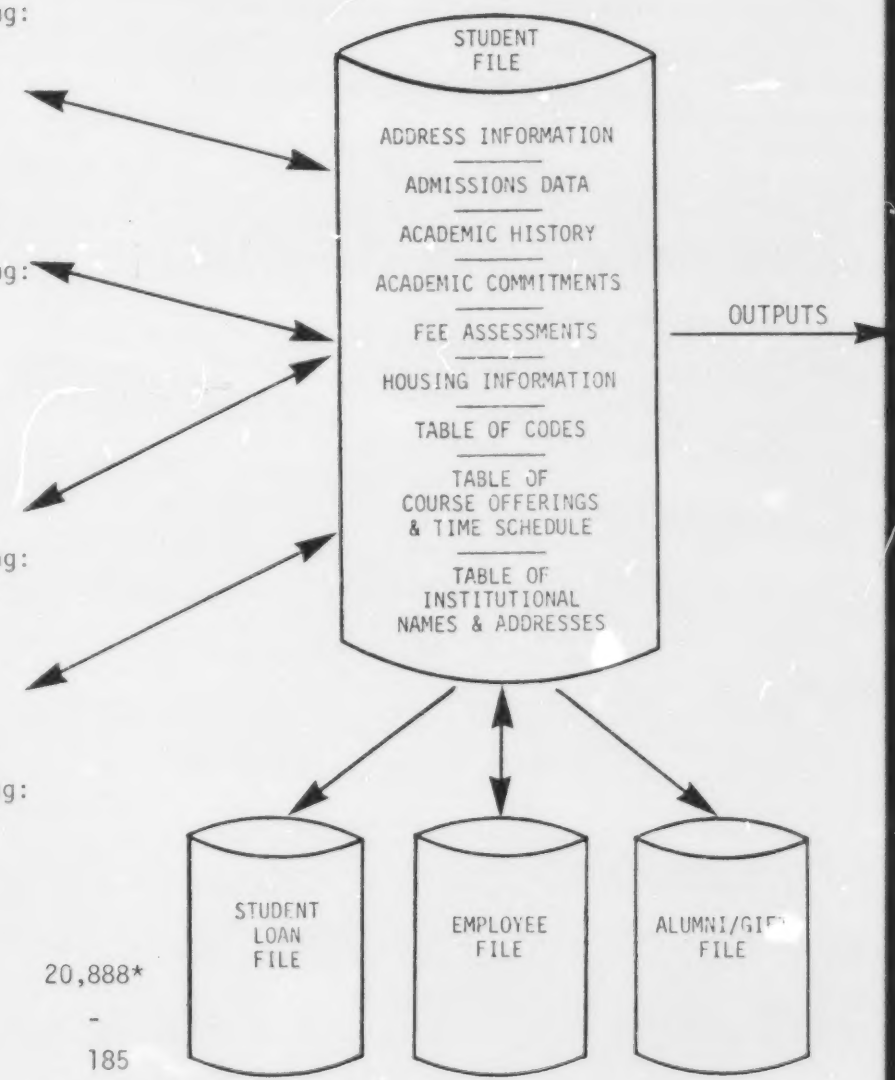
File Maintenance:
- Housing Assignments
- Room and Board Table

Information Retrieval & Reporting:
- Batch

ACADEMIC INFORMATION CENTER

File Maintenance:
- High School Activity
- Freshman Housing Assignments

Information Retrieval & Reporting:
- QUERY and TRG



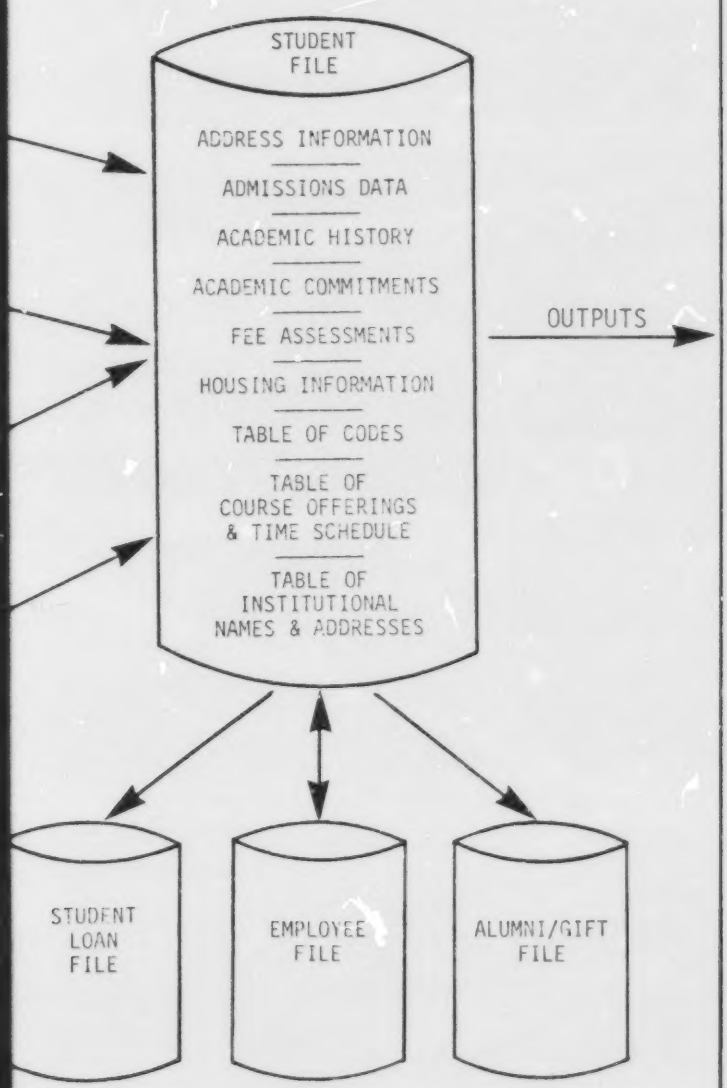
FILE STATISTICS

No. of Records	20,888*
No. of Distinct Segment Types	-
No. of Elements Defined	185
No. of Elements Indexed	29
Average Record Length	588
Total No. of Characters	22,000,000
Est. Annual Input Transactions	151,000

*Includes data on approximately 8000 recently but not currently enrolled students

TANFORD'S OASIS STUDENT RECORD SYSTEM

SCHEMATIC



REGISTRAR

- Advance Registration List
- Permit-To-Register
- Hold on Registration Lists
- Confirmation of Registration
- Address Data Edit List
- Course Data Edit List
- Address Roster
- Student Directory
- Health Service Folder Labels
- Address Labels
- Advisor Code Lists
- Course Offering Lists
- Class List
- Grades
- Electrical Engineering Grade List
- Engineering Grade List
- Freshman Performance
- Transcripts
- Degree Candidate Lists
- Provost's Report
- Utility Lists

HOUSING/DEAN OF STUDENTS

- Housing Draw - Assignment Cards
- Residence Rosters
- Non-resident Students in Housing

ACCOUNTING

- Edit Fee Data Lists
- Fee Assessment Batch Proof Lists
- Fee Assessment Statistical Reports
- Edit Housing Fee Data Lists

Alumni/Gift System - Narrative Description

The OASIS Alumni/Gift system contains a number of specific features designed for the fund raising office to assist in conduct of gift procurement programs and campaign activities that include volunteer management and general progress of the several concurrent campaigns conducted annually by the University, in addition to general file maintenance support of the alumni area. The newly announced Capital Campaign at Stanford will be fully supported by the system.

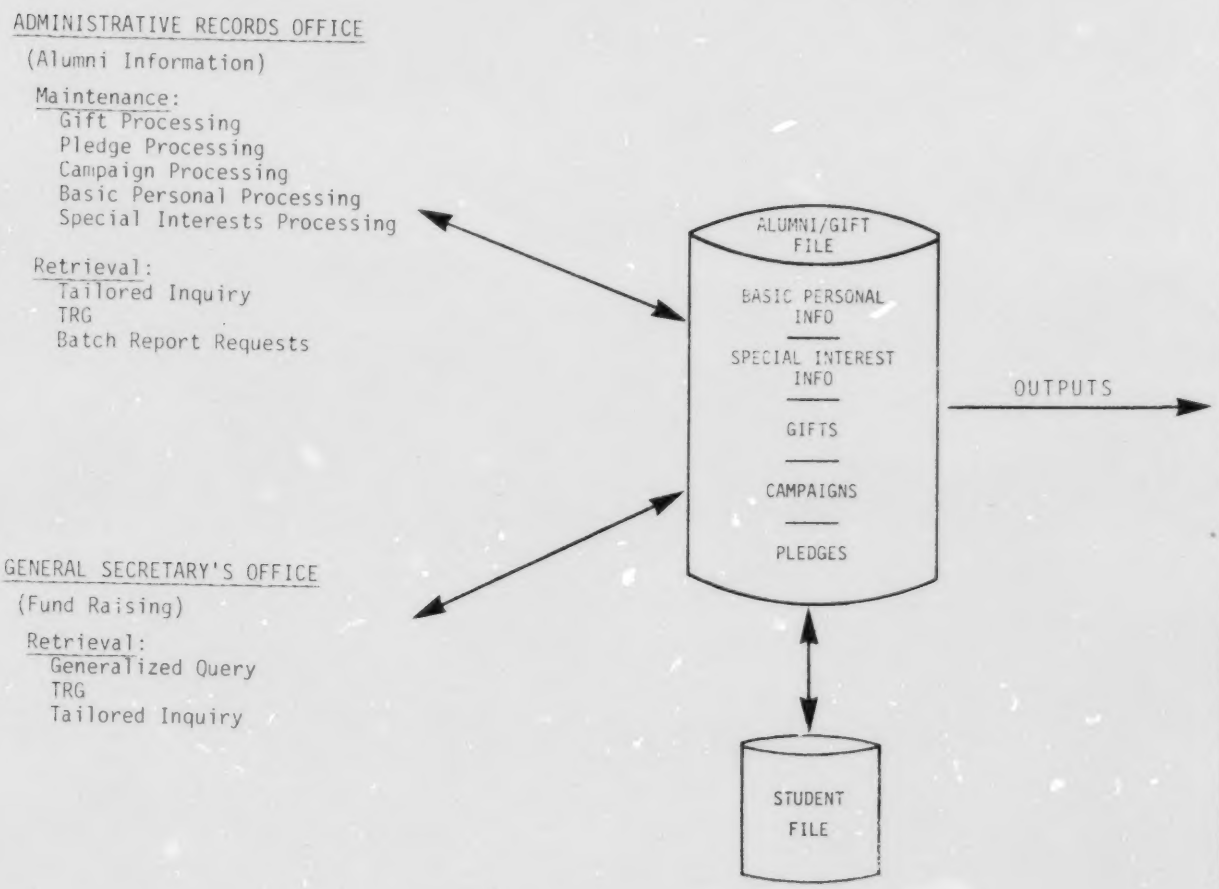
Maintenance of all non-financial data will be accomplished by direct online update with terminal entered batch update used for gift processing. Transactions will be entered from terminals installed in the Office of Administrative Records.

Information retrieval needs of both records maintenance and fund raising personnel will be met by a combination of tailored online networks, specially written OASIS batch programs, and use of the QUERY and Terminal Report Generator services. Scope of these requirements is indicated on the system schematic (following page).

The system is currently in test stage and will begin to support the Annual Gift Campaigns in September, 1972. Subsequent system features will become operational as they are tested and validated. The system is expected to be fully operational by the end of the first quarter 1973.

STANFORD'S OASIS ALUMNI/GIFT SYSTEM

SCHEMATIC

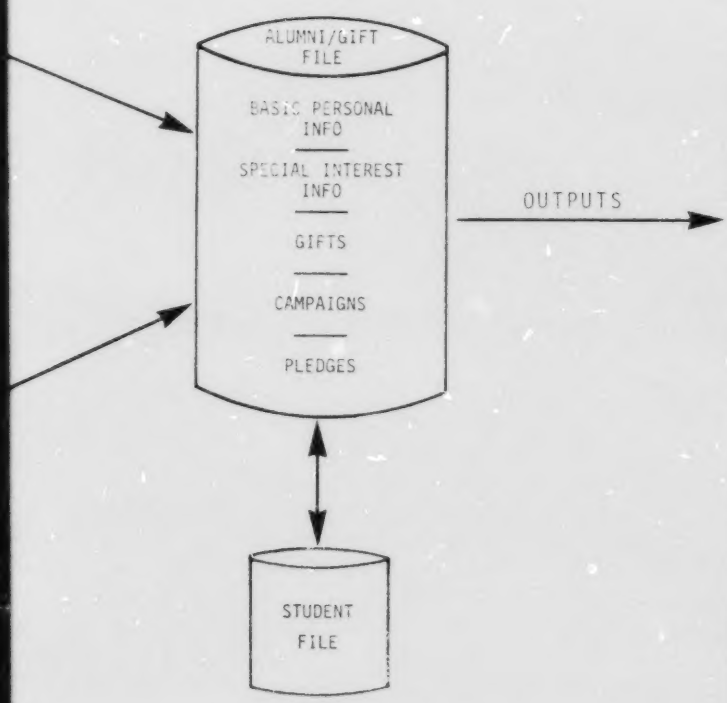


FILE STATISTICS

No. of Records	180,000
No. of Distinct Segment Types	86
No. of Elements Defined	310
No. of Elements Indexed	52
Average Record Length (bytes)	346
Total No. of Characters	89,000,000
Est. Annual Input Transactions	270,000

STANFORD'S OASIS ALUMNI/GIFT SYSTEM

SCHEMATIC



080,000
86
310
52
346
000,000
270,000

ACCOUNTING:

Gift Detail Alpha
Gift Detail Area
Gift Detail Donor Type
Gift Detail Source
Gift Detail Tag #
Gift Detail School and Department

Gift Summary By Area
Gift Summary Donor Type
Gift Summary Source
Gift Summary School and Department

BIOGRAPHIC:

Prospect Listings to Module Combinations
Professional Fund Quarterly Listings
Basic Information Listing
Alumni/Friend Information Listing
Confidential Information Listing
Gift and/or Pledge Information Listing
Census Reports
Deceased Reports
Name/Address only - Special Listing
Unknown Address

PROGRESS REPORTS:

Campaign National Summary
Campaign Divisional Summary
Campaign Team Summary
Campaign Worker Summary
Mail Appeal Report to Class Agents/Fund Chairman
Gifts $1000 and Over - All Campaigns
Gifts - Plus or Minus from Previous Year - Any Campaign
Gifts - Plus or Minus from Previous Year - All University Specify Gift Amount
Campaign Volunteer Enlistment Inventories
Commitment Reports

STATISTICAL REPORTS:

CFAE Reports
ACE Reports
Gifts to Schools and Departments by Purpose
Gifts to Area by Donor Type
Comparative Summary - by Campaign
Comparative Summary - by Program
Comparative Summary - by Fund
Summary by Source Number
Gift Detail - Donors of Specified Gift Amount and Over
Comparative Summaries - Rated Prospects
Gifts by Range and Source
Gift Analysis by School
Five Year School Gift Analysis

SPECIAL:

Associates Verification Report Form
Campaign Assignment Card Report Form
Biographic, Progress, Statistical, Module Built as Needed
Directories

MAILING LABELS: (6 & 7 Lines)

ID Lines Options are:

Stanford # only
Fund ID Stanford #
Fund ID Stanford # Fund Year

ACCOUNTING SYSTEM

Transactions for fund reporting

16/17

Employee Data System - Narrative Description

The system supports the payroll and personnel functions of the University. The design takes into account the need for meaningful employee information as required by emerging employer-employee relationships, increased government compliance reporting and mounting financial pressures in the University.

Employee information (which is vital to this system) originates in academic and administrative departments throughout the University. The Personnel & Employee Relations Department and the Payroll Office have responsibility for file maintenance of data that is specific to their individual responsibilities. Two modes of operation will be available for collecting information: online terminal data capture and batch file maintenance from keyed input. It is expected that 60 percent of all transaction data will be collected online and that the remainder constitutes large volume end-of-pay period input, and overflow during peak periods in the fall of each year. There are many traditional reports in Payroll and Personnel that will continue to be produced because of legal requirements. In addition, it is estimated that there will be in excess of 1,500 annual requests for information. Most of these will be routine and scheduled.

The processing functions to be developed include:

- Payroll - Maintenance, Benefits Accounting, Special Check Processing, Expenditure Accounting, Tax Accounting and Reporting.
- Personnel - Maintenance, Skills Retrieval, Affirmative Actions Programs, Benefits Processing and Analysis, Job Classification and Pay, Job Applicant Processing and Reporting, Faculty/ Staff Directory Processing, Insurance Claims, Recording and Analysis and Mailing Services Processing.

The system will be implemented in stages beginning this fall.

STANFORD'S OASIS EMPLOYEE DATA SYSTEM

SCHEMATIC

PERSONNEL

Maintenance

Basic Personal Processing
Applicant Processing
Faculty/Staff Directory Processing
Education & Work History Processing
Insurance Benefits & Claims Processing

Retrieval

Generalized QUERY
Generalized TRG
Tailored Inquiry
Batch Report Requests

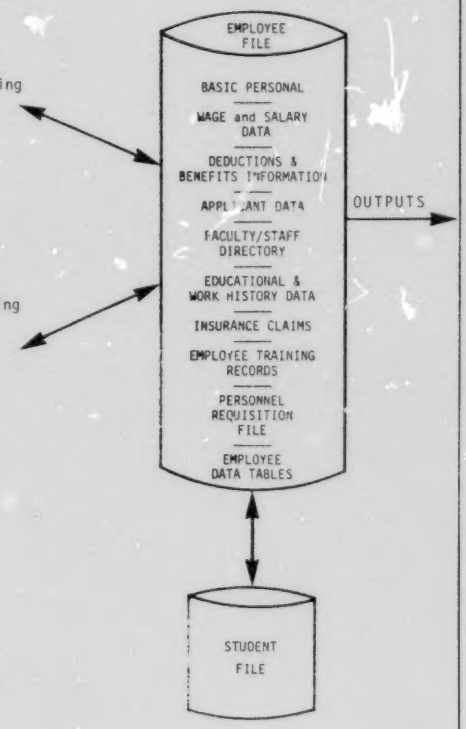
PAYROLL

Maintenance

Wage and Salary Processing
Federal & State Withholding Processing
Payroll Deductions Processing

Retrieval

Generalized QUERY
Generalized TRG
Tailored Inquiry
Batch Report Requests



FILE STATISTICS

No. of Records	20,500
No. of Distinct Segment Types	48
No. of Elements Defined	280
No. of Elements Indexed	49
Average Record Length	1,366
Total No. of Characters	28,000,000
Est. Annual Input Transactions	200,000

EMPLOYMENT PROCESSING

Open Personnel Requisitions
Applicant Skill Retrieval
Applicants by Job Class
Applicant Referrals
Current Promotable Employees
Recruitment Source Report
Applicant Rejection by Reason
Affirmative Action Commitment Progress
Student Employment Utilization
Employee Terminations
Employee Turnover Summary
Unemployment Insurance Claims by Department
Career Path Analysis
Employee Leave Usage by Department
Patent Agreement Status

PERSONNEL INFORMATION MANAGEMENT

Employee Status
Personnel Actions Control
Requisition Hourly Status
Personnel Actions Summary
Minority Employment
EEO-1 Report
Overtime Report
Faculty/Staff Leave Status
Employee Education
Previous Work History
Appointment Expirations
FTE Analysis by Department
Faculty/Staff Directory

LABOR RELATIONS

Bargaining Unit Employee Characteristics
Bargaining Unit Wage Analyses
Bargaining Unit Turnover Statistics
Bargaining Unit Benefits and Claims

BENEFITS PROCESSING

Benefits Eligibility and Enrollment
Long Term Disability Eligibility
TIAA/CREF Initial Eligibility
Five Year List of Retirements Pending
Eligibility Changes
Annual Compensation & Benefits Report to Employee
Benefit Plan Enrollment Summary
Benefit Plan Claims

TRAINING

Potential Training Program Enrollees
Training Program Participation
Training Analysis Report
Supervisory Training Report
Skills Trainee Progression & Retention
Youth Opportunity Program Employee Characteristics

PAYROLL DATA MAINTENANCE

File Maintenance Rejects
Soc. Sec. No. Cross Reference
Payroll Information Cards
Pay/Deduction Terminations

PAYROLL PROCESSING

Payroll Register
Direct Deposits Bank List
Check Register
Payroll Checks

PAYROLL REPORTING

Deductions/Reductions this Payroll
Payroll Budget Distribution
Soc. Sec. Number Changes
Annual W-2 List
Fiscal Year Student Earnings Summary
W-2 Address Verification Cards
W-2 Statements
Master File Purge List

ACCOUNTING SYSTEM

Transactions for expenditure reporting

Budget System - Narrative Description

The objectives of the budget system which is now in preliminary design, are to:

(1) Provide an immediately accessible data base of budget and budget related information for planning and analysis purposes.

(2) Provide for machine generation of budget working documents during the annual processing cycle.

(3) Produce the University budget document by machine.

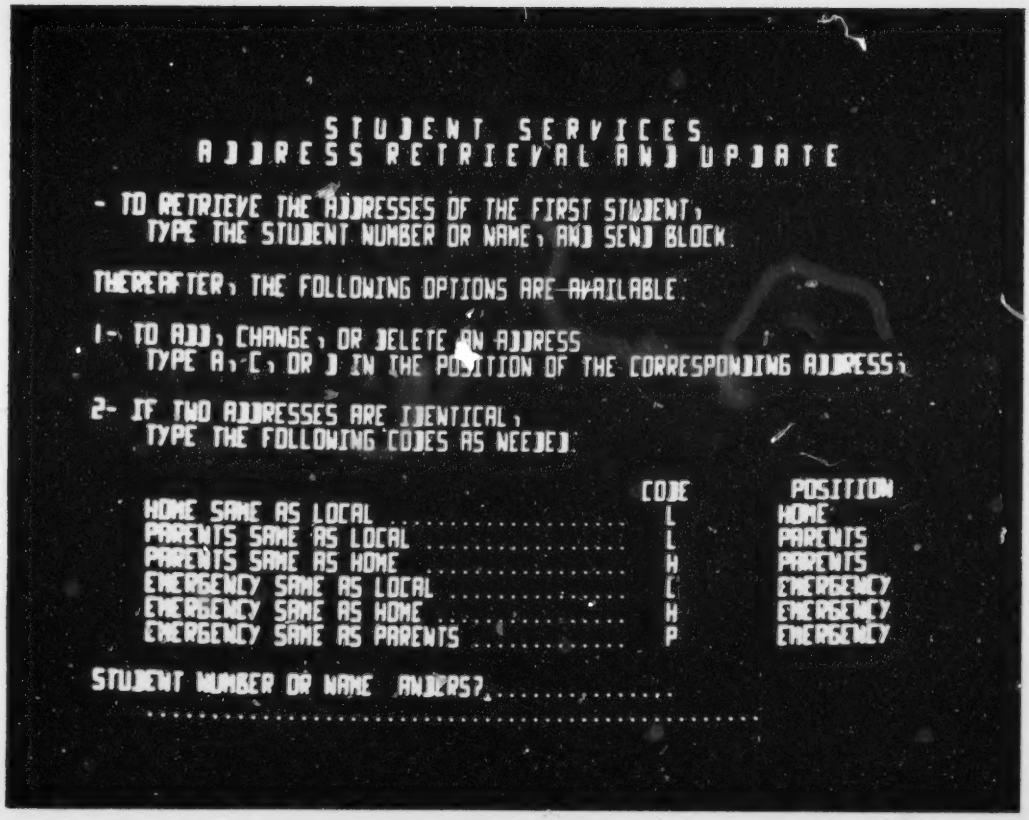
(4) Automate the present manual interface between the budget system and the University accounting and financial reporting system.

(5) Make provision for manpower control for personnel management and budgeting control.

In order to meet these design objectives, a number of complex interfaces to the contents of other OASIS files, chiefly the Employee file, must be worked out. In particular, common agreement among the Budget, Personnel, Provost, Accounting, and Analytical Studies Offices must be reached on procedures for identifying the number of authorized positions of various job types in the University. Discussions on this matter have been further complicated by recent new requirements of the federal government relating to information on employee minority status, job history, compensation history, etc.

The contents of the budget file will include data on three budget years - past, current, and projected - and actual expenditure data for the last year and current year-to-date. Additionally, a number of OASIS indirect file references will be defined to data contained in other files, which will assist in studying the complex cost relationships which exist within the operating budget with the purpose of improved resource allocation and control.

It is planned to put a prototype budget file into operation in the fall of 1972 for terminal inquiry and report generation during the 1973-74 budget cycle. Based on lessons learned during this period, operational support will be provided during the 1974-75 cycle commencing in the fall of 1973.


STUDENT SERVICES
ADDRESS RETRIEVAL AND UPDATE
- TO RETRIEVE THE ADDRESSES OF THE FIRST STUDENT,
TYPE THE STUDENT NUMBER OR NAME, AND SEND BLOCK.
THEREAFTER, THE FOLLOWING OPTIONS ARE AVAILABLE.
1- TO ADD, CHANGE, OR DELETE AN ADDRESS
TYPE A, C, OR D IN THE POSITION OF THE CORRESPONDING ADDRESS.
2- IF TWO ADDRESSES ARE IDENTICAL,
TYPE THE FOLLOWING CODES AS NEEDED.
CODE POSITION
HOME SAME AS LOCAL ..... L HOME
PARENTS SAME AS LOCAL ..... L PARENTS
PARENTS SAME AS HOME ..... H PARENTS
EMERGENCY SAME AS LOCAL ..... L EMERGENCY
EMERGENCY SAME AS HOME ..... H EMERGENCY
EMERGENCY SAME AS PARENTS ..... P EMERGENCY
STUDENT NUMBER OR NAME ANDERS?.....
.....

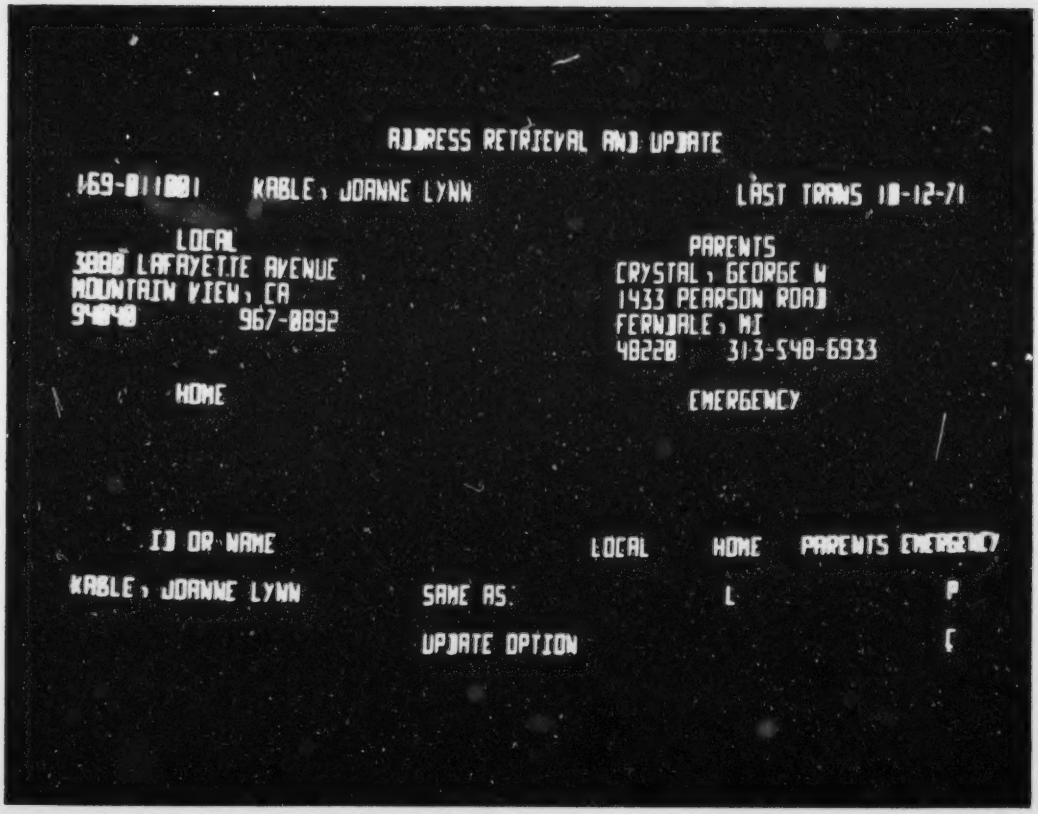
2.4 Selected CRT Displays from Student System

The pictorial essay beginning on this page contains photographs of CRT terminal displays used in the new Student Records system. They are part of online networks designed to facilitate the retrieval and maintenance of student information. A separate network handles each class of data serviced by various sections in the Registrar's Office. Three networks are represented in this pictorial:

(1) Student Address Retrieval and Maintenance

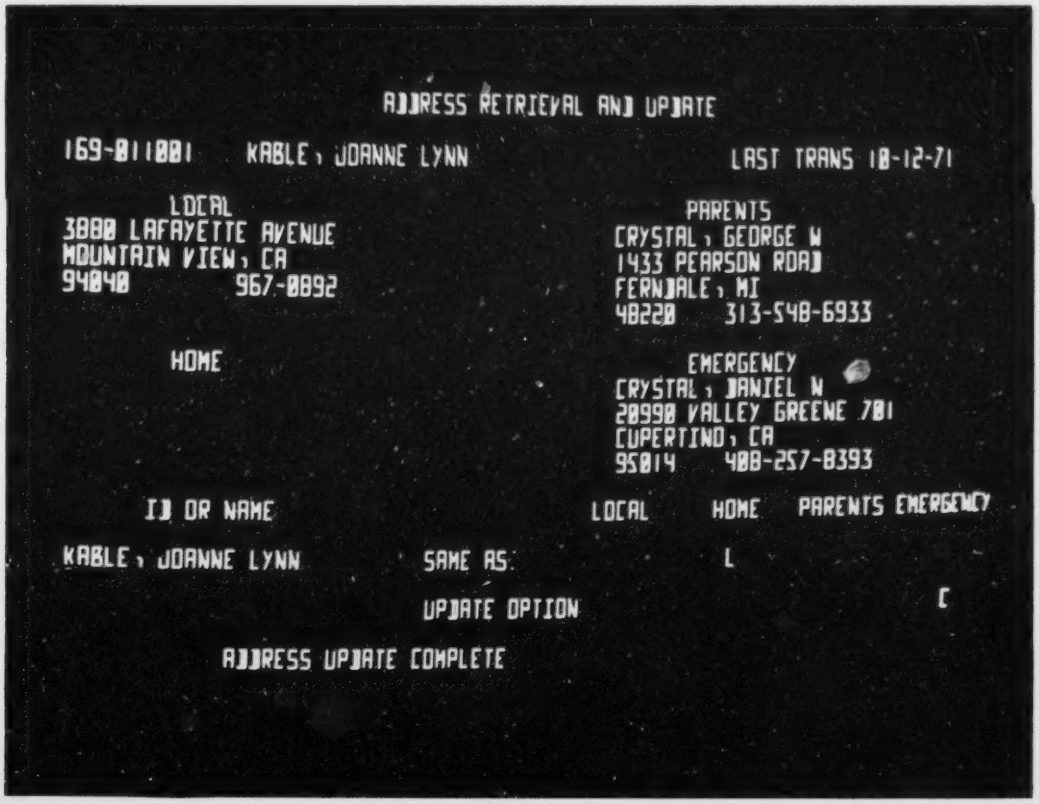
(2) Student Course List Retrieval and Maintenance

(3) Student Grade Processing and Class List Retrieval

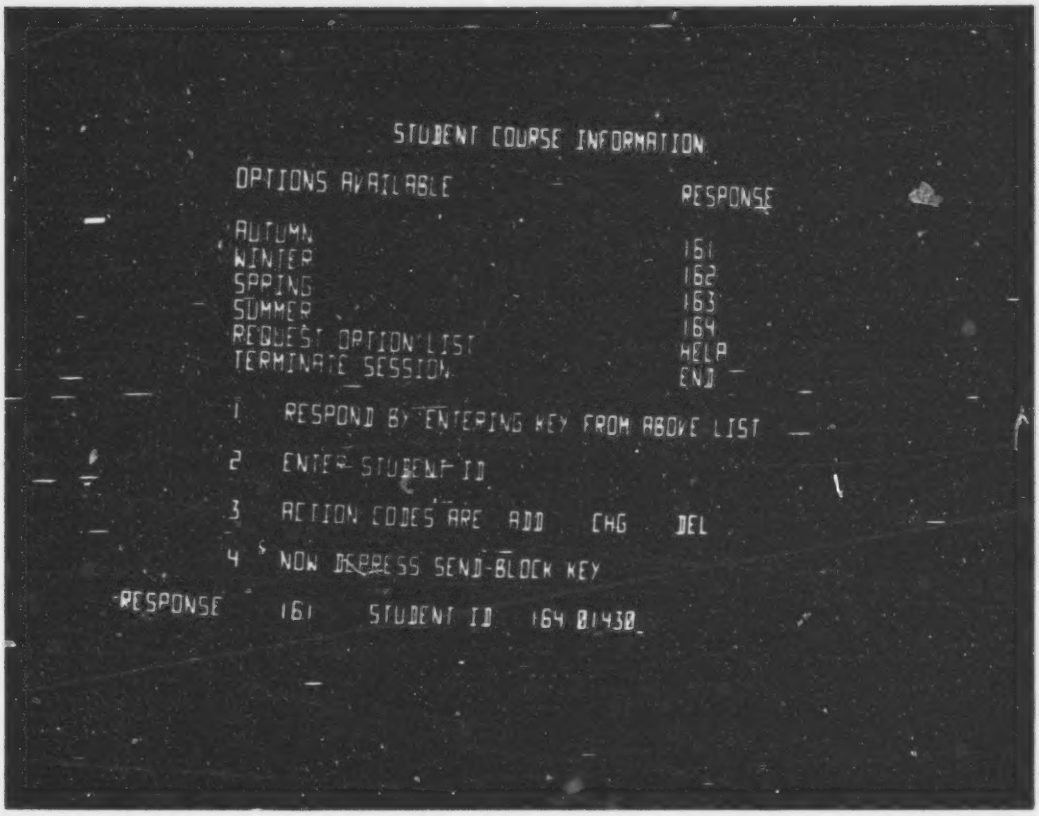


The address information on the student is displayed. The codes in the lower right corner indicate that her home and local addresses are one and the same, and that her parents are to be contacted in case of an emergency. (Note the 'P' beneath EMERGENCY in the SAME AS line.) In the example, the user has requested a change in the emergency address. (Note the 'C' beneath EMERGENCY in the Update Option area.)

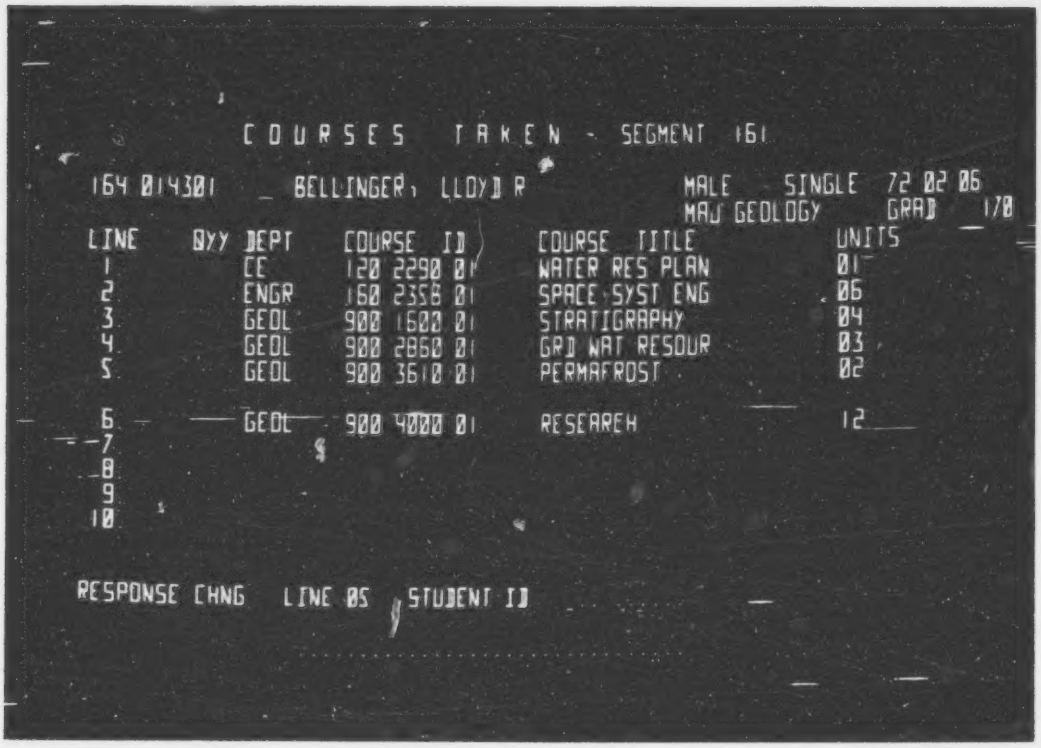
After the user has entered a specification for a separate emergency address, the system processes the request, updates the data record, and deletes the SAME AS flag. To assure the user that the change has been made, a message indicates that the update is complete.

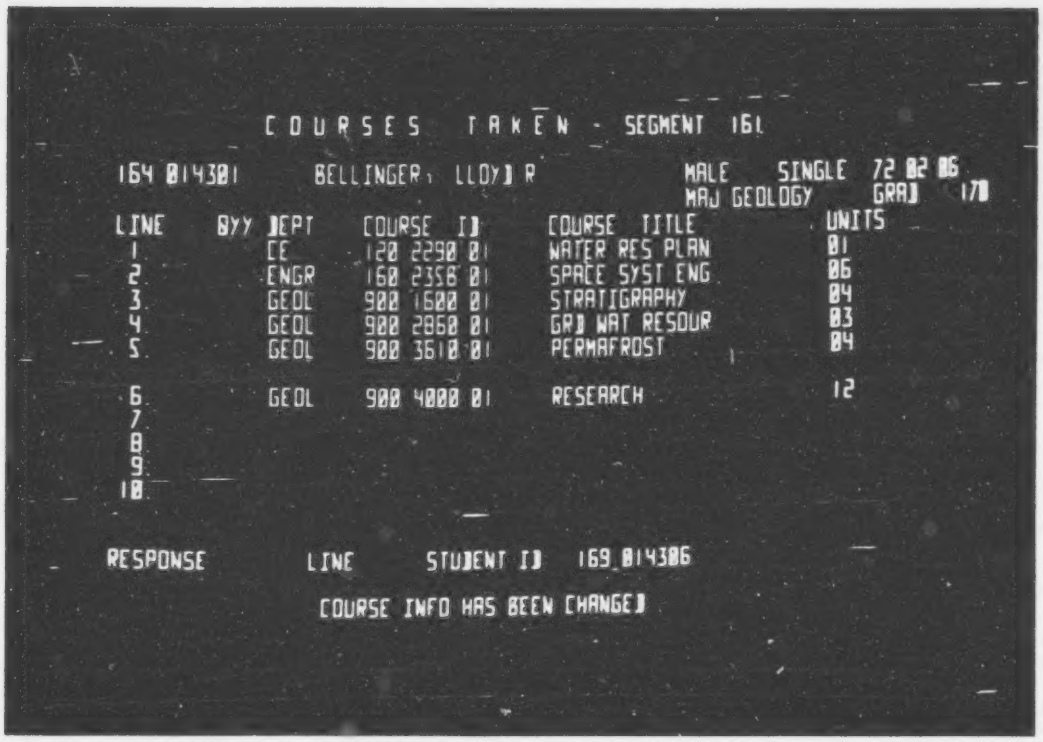


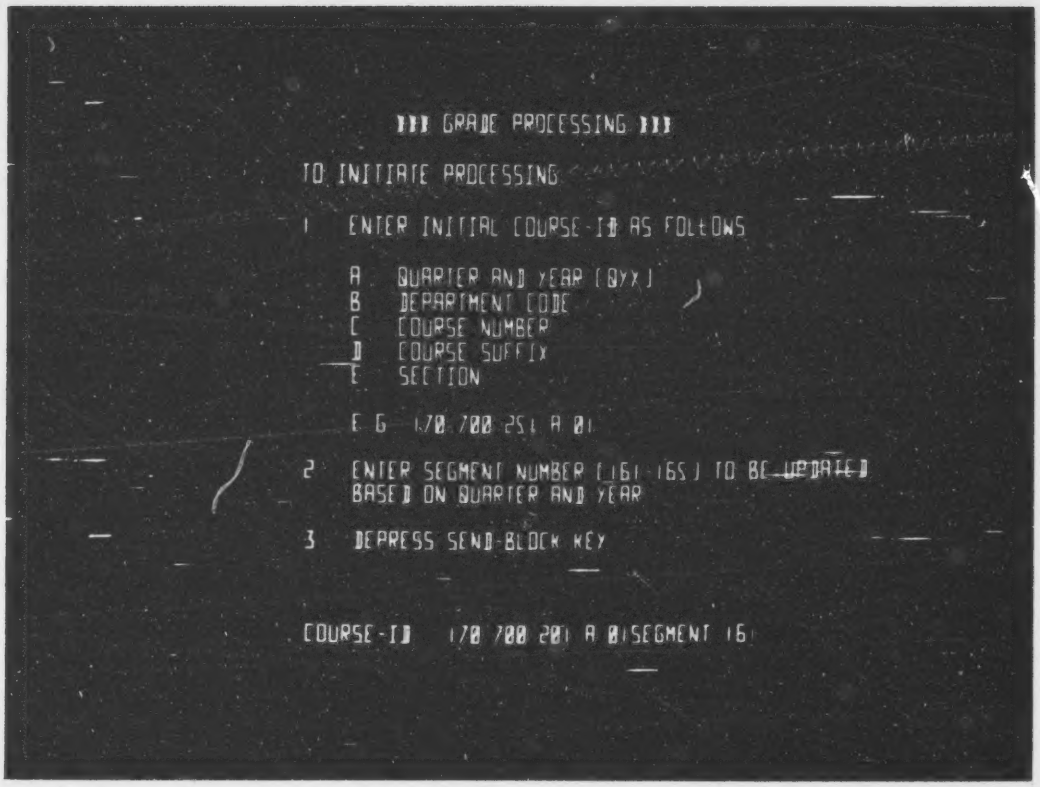
Current student course enrollment information may be displayed and/or modified by means of another of the Student Records system networks. The user specifies by quarter any of the course lists, past or present, for a given student. He may then modify by line number a course ID or credit units. If he alters a course ID, the system automatically returns the new department code and course title.



In this example, the courses for fall quarter of 1961 (161) were requested for student 164 01430. The user signals a change to the fifth course by the response CHNG 05. The system positions him at the appropriate line and automatically tabs between the course ID field and the units area. When the change is entered, the system modifies the data record and again indicates that the change has been made. (In the example, the credit units for PERMAFROST were increased from 2 to 4.)


COURSES TAKEN - SEGMENT 161
164 014301 BELLINGER, LLOYD R MALE SINGLE 72 02 06
MAJ GEOLOGY GRAD 170
LINE BYY DEPT COURSE ID COURSE TITLE UNITS
1 CE 120 2290 01 WATER RES PLAN 01
2 ENGR 160 2358 01 SPACE SYST ENG 06
3 GEOL 900 1600 01 STRATIGRAPHY 04
4 GEOL 900 2860 01 GRD WAT RESOUR 03
5 GEOL 900 3610 01 PERMAFROST 02
6 GEOL 900 4000 01 RESEAREH 12
7
8
9
10
RESPONSE CHNG LINE 05 STUDENT ID


COURSES TAKEN - SEGMENT 161
164 014301 BELLINGER, LLOYD R MALE SINGLE 72 02 06
MAJ GEOLOGY GRAD 170
LINE BYY DEPT COURSE ID COURSE TITLE UNITS
1 CE 120 2290 01 WATER RES PLAN 01
2 ENGR 160 2358 01 SPACE SYST ENG 06
3 GEOL 900 1600 01 STRATIGRAPHY 04
4 GEOL 900 2860 01 GRD WAT RESOUR 03
5 GEOL 900 3610 01 PERMAFROST 04
6 GEOL 900 4000 01 RESEARCH 12
7
8
9
10
RESPONSE LINE STUDENT ID 169 014306
COURSE INFO HAS BEEN CHANGED


GRADE PROCESSING
TO INITIATE PROCESSING
1 ENTER INITIAL COURSE-ID AS FOLLOWS
A QUARTER AND YEAR (QYY)
B DEPARTMENT CODE
C COURSE NUMBER
D COURSE SUFFIX
E SECTION
E G 170 700 251 A 01
2 ENTER SEGMENT NUMBER (161-165) TO BE UPDATED BASED ON QUARTER AND YEAR
3 DEPRESS SEND-BLOCK KEY
COURSE-ID 170 700 201 A 01SEGMENT 161

The third network handles two major functions:

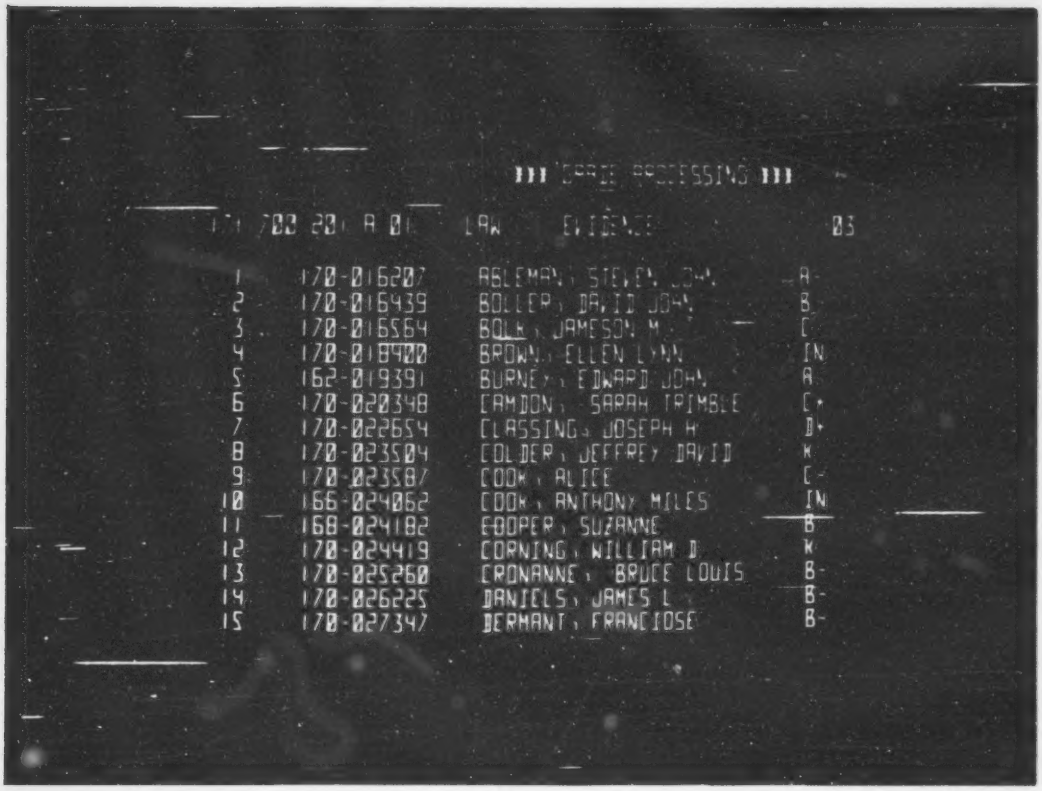
(1) Class Enrollment Queries

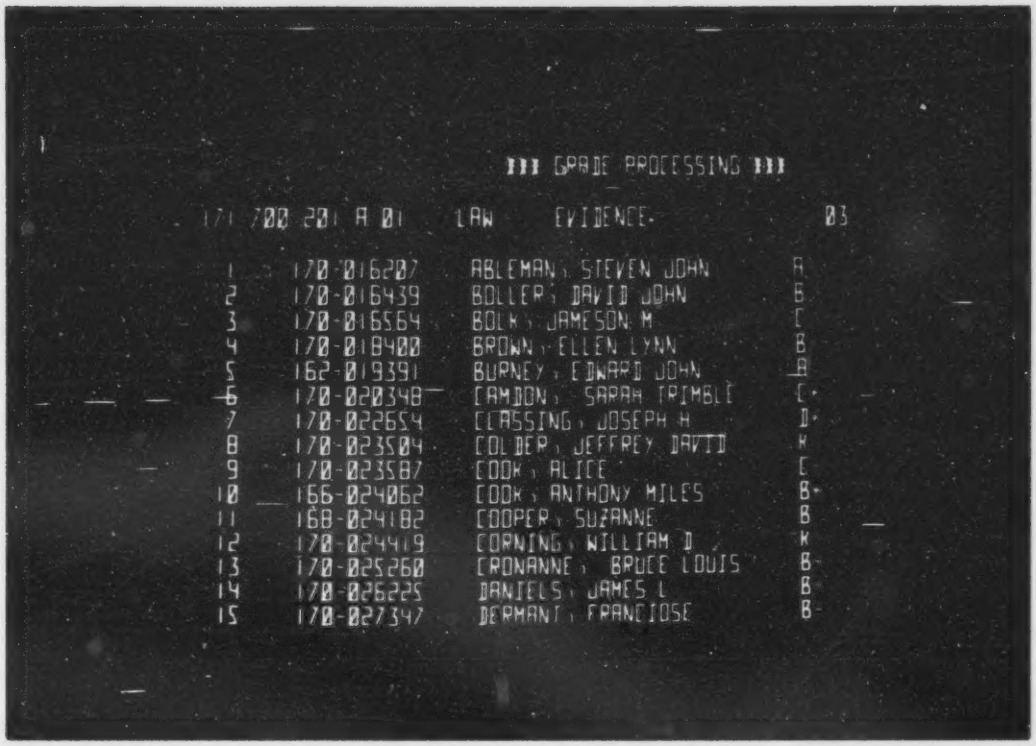
(2) Grade Posting and Correction

By specifying a course ID and quarter designation, the user may review the enrollment of any class held in the prior year. Grades can be posted or corrected via the same network. The system automatically determines which grades have been modified. Those grades are changed in the appropriate data records and a report is returned of how many updates were performed.

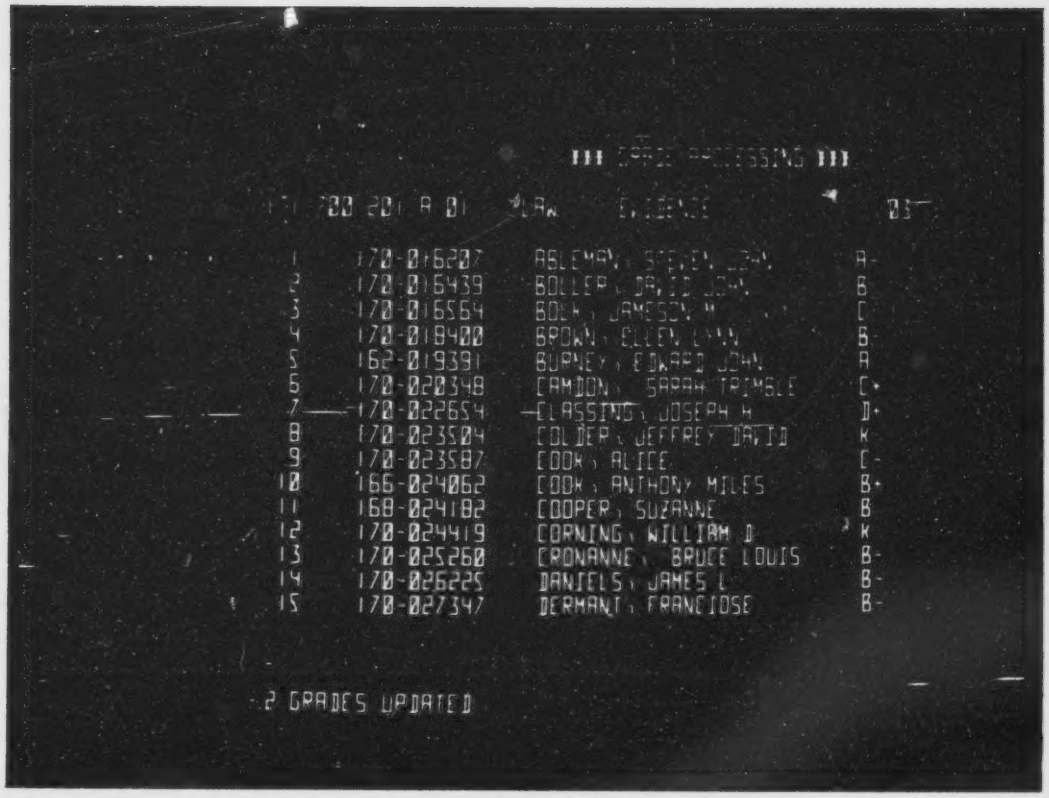
In this example, the class list is requested for course 170 700 201 A 01 of autumn quarter in the prior year.

The class list is displayed in student number order. Since this class met in a prior quarter, the grades also appear. The user may now request more of the same class or the list for another class; or he has the option of modifying one or more grades in the displayed list.


LAW
1 170-016207 ABLEMAN, STEVEN JOHN A-
2 170-016439 BOLLER, DAVID JOHN B
3 170-016564 BOLK, JAMESON M C
4 170-016700 BROWN, ELLEN LYNN IN
5 162-019391 BURNEY, EDWARD JOHN A
6 170-020348 CAMDON, SARAH TRIMBLE C+
7 170-022654 CLASSING, JOSEPH H D+
8 170-023504 COLDER, JEFFREY DAVID W
9 170-023587 COOK, ALICE C-
10 166-024062 COOK, ANTHONY MILES IN
11 168-024182 COOPER, SUZANNE B
12 170-024419 CORNING, WILLIAM D W
13 170-025260 CRONANNE, BRUCE LOUIS B-
14 170-026225 DANIELS, JAMES L B-
15 170-027347 DERMANT, FRANCIOSE B-


GRADE PROCESSING
171 700 201 A 01 LAW EVIDENCE- 03
1 170-016207 ABLEMAN, STEVEN JOHN A
2 170-016439 BOLLER, DAVID JOHN B
3 170-016564 BOLK, JAMESON M C
4 170-018400 BROWN, ELLEN LYNN B
5 162-019391 BURNEY, EDWARD JOHN B
6 170-020348 CAMDON, SARAH TRIMBLE C
7 170-022654 CLASSING, JOSEPH H D
8 170-023504 COLDER, JEFFREY DAVID W
9 170-023587 COOK, ALICE C
10 166-024062 COOK, ANTHONY MILES B-
11 168-024182 COOPER, SUZANNE B
12 170-024419 CORNING, WILLIAM D W
13 170-025260 CRONANNE, BRUCE LOUIS B
14 170-026225 DANIELS, JAMES L B
15 170-027347 DERMANT, FRANCIOSE B

Grade posting and alterations are made directly onto the display of the class list. The cursor automatically tabs from one grade field to the next/prior one. In the example, the incomplete courses (code IN in the previous photograph) are to receive grade postings. The user tabs to grade field 4 and changes the IN to the completed grade of B-, then tabs to the tenth field and types in a B+. Since these are the only changes to this page of students, he sends the data into the system.



The system compares the incoming grades with the ones that were originally displayed. If there are alterations and the new grades are validly coded, the appropriate student records are modified. Finally, a count of the grade modifications performed is reported back to the user as a control check mechanism.

SECTION 3 - OASIS DEVELOPMENTS

OASIS is now running in production mode at Stanford in a machine environment very similar to that for which it was originally designed, although the 360/40 processor used by the Administrative Computing Facility has now been replaced by a 370/145 processor of the same 256K byte main memory capacity. Currently a dozen online terminals are supported in a 128K partition of the processor, with system activity being primarily oriented to application development, as described in Section 2 of this report. A machine configuration diagram is presented in Figure 3-1.

3.1 OASIS Modifications and Extensions

Since the initiation of Project INFO, there has been a close working relationship between those responsible for development of the data base software, i.e., OASIS, and those responsible for using OASIS to solve user data processing and analysis problems. Although there have been a number of instances in which one group was waiting for the other to solve a design or performance problem, on the whole the interaction between the two groups has been invaluable, with each benefiting from the opportunity to influence the design approach of the other. This process is by no means complete, and will continue as more applications are developed and put into operation, and as operating statistics on OASIS internal performance become available.

As a result of a year's operating experience with the prototype version of OASIS, numerous system modifications and extensions have been made. Among the more noteworthy are:

a) The original relocating loader for online modules was interfaced to the DOS Relocatable Library. In practice, with application networks having large numbers of separate modules, the load time of about 1.5 seconds was impacting online performance. A new high performance loader, running against a specialized program library, is expected to reduce load time to one hundred milliseconds or less.

b) Deeper analysis of the problems associated with system recovery and backup support has resulted in an extended design which deals

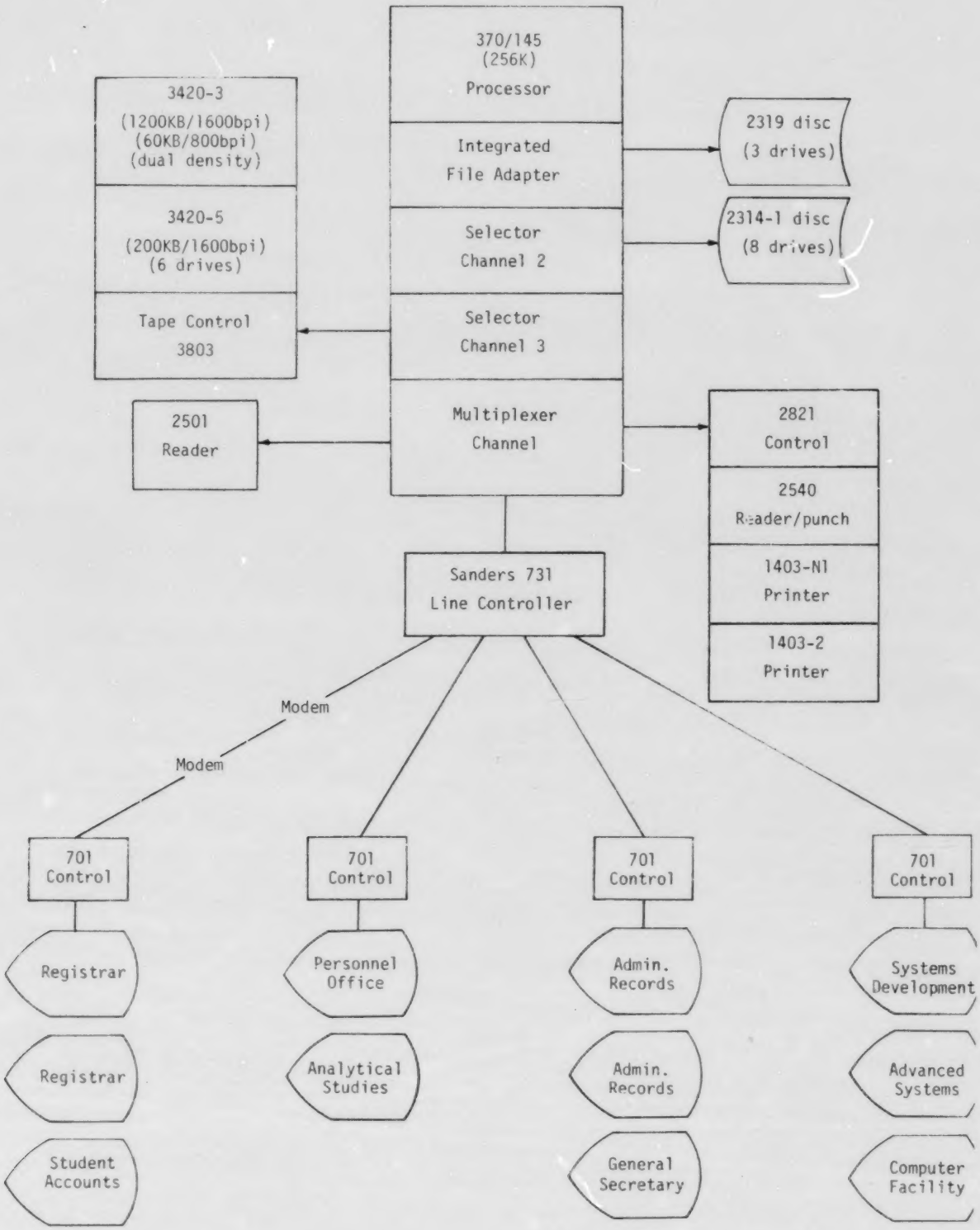


Figure 3-1 Administrative Computer Facility Machine Configuration

with both the physcial integrity of the data base, as well as with the logical integrity of processing. The difference between the two is illustrated by the situation where one logical update might require physical updates to more than one record, such as the case in which the marriage of two alumni requires changes to both of their personal records and to their giving records. Application programs which require protection for the chain of physical updates which collectively represent a single logical change to a file have been given facilities to signal OASIS to that effect and receive recovery support in the event of a system failure.

c) A new QUERY feature, named RECORDS, was added in response to user developed needs to retrieve the number of records in a given file population, as opposed to the COUNT feature, which provides the number of occurrences of a named data element, and which may vary from the record count in those instances where an element is defined to have a variable number of occurrences within a given segment or record. An example is the number of gifts which a specific alumnus has given.

d) Initial use of the extensive software file security features of OASIS has been satisfactory, although it is apparent that this is an area where only extended use will provide a complete understanding of the problems. It has been found feasible to provide limited terminal security within the OASIS password structure, and this will be used to protect certain sensitive information. A new feature essentially provides that certain passwords may be used only from specified terminals. If these are the only passwords associated with the sensitive portions of a given file, then that portion of the file is effectively accessible only from the limited number of terminals which will accept the passwords. The selectivity of this feature allows system wide access to nonconfidential portions of all OASIS files, while preserving lockout capability on the sensitive file contents. Terminal logon procedures have also been revised to provide a password entry area which is displayed in a manner that the password cannot be read on the screen as it is being entered.

e) The support for remote hard copy printers provided by the Sanders' standard hardware involves the unloading of the terminal

memory buffer to an attached Teletype or Teletype compatible printer. For a number of reasons, including locking of the CRT display during printing, this support has been found unsatisfactory. A new approach, utilizing the UNIVAC DCT-100 30cps printer, driven from terminal services code resident in the processor memory, has been provided to OASIS users. Although overcoming many of the previous deficiencies, this solution requires relatively expensive hardware which results in a monthly hardcopy printer cost of $275. Less expensive alternatives are under study as part of the review of the next generation CRT terminals to be used in OASIS, which is described later in this section.

f) The task scheduler code contained in the first version of OASIS executive control treated each active task as having essentially equal priority. As more knowledge has been accumulated about system performance, it has become apparent that some discrimination will be necessary to avoid tasks with extended I/O requirements, such as large Queries, from degrading system response time for other users. Modifications to the task scheduler have been made to provide the ability to discriminate among various types of terminal activity.

g) Management of the temporary disc space required for the Generalized Services and for the Select service has been revised, which has improved the performance of all of these services and the application programs dependent upon them.

3.2 System Measurement

As OASIS enters a live production environment at Stanford, previous plans for extensive system measurement are being implemented. The measurement project is being aided by the efforts of a graduate student from the Electrical Engineering Department with prior systems measurement experience. The work has been divided into two parts: task measurements and system measurements. Included in task measurements are all activities which pertain to each online terminal, its users, networks, and files used. Time profiles of system use, response time, I/O counts, etc., will be generated from the data which is collected. System measurements will collect information about the operation of OASIS internal programs. Included will be data about resource

allocation, queue lengths, request conflicts, task scheduling, etc.

Results of system measurements will be used for many purposes, both short and long range, including optimization of OASIS code, balancing of the computer hardware configuration, study of the behavior of system users as they adapt to a new information processing environment, and projection of the long term unit costs of computing support for Stanford administration.

3.3 Future Developments

At the initiation of software development work in 1969, a survey of administrative computers at other institutions indicated that a large number were running under IBM's Disc Operating System (DOS) and because of this and other factors, a decision was made to interface OASIS to DOS as the host operating system. Since that time there has been rapid change in the computing environments at many institutions and the primary interest of potential external users of OASIS currently lies in a version which is compatible with IBM's full Operating System (OS). In view of this interest and because of the desire to make OASIS and its applications as broadly available as possible, an agreement was reached with IBM early in 1972 for the production of a detailed design specification for an OS version of OASIS. This work is now nearly complete, and the volume will be published by late spring of 1972. The text is addressed to a knowledgeable systems programmer working in an OS machine environment, and it is anticipated that the necessary changes to the DOS version of OASIS could be accomplished with three or four man-months of effort.

The computer terminal market has been especially active in the past year, with many new models being introduced. In addition to mechanical and electrical improvements, expanded functional capability, and better price performance, the advent of LSI semiconductor memory has produced considerable discussion of terminal "intelligence." (See Dick Canning's April 1972 EDP Analyzer for a more comprehensive review of the issues.) Inexpensive and microminiaturized memory and logic have allowed the terminal manufacturers to place many functions which formerly required mainframe processor power in the terminal package

itself, including editing and temporary storage of data.

At the present time, OASIS supports only the Sanders 720 CRT terminals. A number of system functions, including line control, polling, the Generalized Services, and terminal services provided to application programs have been tailored to the features of this terminal. In reviewing the possibility of adapting OASIS to the new generation terminals, it has become apparent that the largest part of the task involves the necessary changes to OASIS software. Any proposal to replace the Sanders terminals must include better price performance, extended capability, and future adaptability to changing system requirements. Very little of the detailed study necessary before a new terminal can be selected has been completed at this time; however, it is likely that a new terminal interface will be developed and made available during the summer of 1973. Possible replacements for the Sanders 720 include the IBM 3270, Sanders 804, and Four Phase System IV.

3.4 Support for External Users of OASIS

In the summer of 1971, OASIS was made available on a limited pilot test basis to institutions desiring to include the system in their computer development plans. It subsequently was put into operation at the University of Vermont on a 370/145, and in the Canadian province of Quebec at the University of Sherbrooke on a 360/40.

It has been found essential that at least one person from the receiving institution spend a three day orientation period at Stanford. This has been particularly necessary in the last year because full documentation was not available and the system was not yet in a stable production version. Following the orientation period at Stanford, assistance has been provided by means of mail and telephone consultation, site visits, and periodic distribution of system changes.

Continuing support for external users of OASIS was requested and received from the Ford Foundation as part of the renewal grant. Until the expiration of current funding in August 1973, a senior member of the staff will be available on a full-time basis to assist other institutions who wish to use OASIS as part of their administrative computer system.

Appendix I - Network Programming Techniques

This appendix is intended to give a brief discussion of the advancements that have been made in network programming since the first prototype online network was developed under OASIS.

Unlike programming in a batch environment, online programming under OASIS has a limit of 2048 (2K) bytes per module. This concept necessitates a network system design which can perform all the functions of a batch program while maintaining a rigorous modularity. GS0502 is an online retrieval and update network which is used in this appendix to illustrate how these conditions can most effectively be satisfied. This network will soon be used in production at Stanford. Throughout the execution of this network, no more than two levels of 2K modules occupy memory at any given time. In all, there are over 112 modules involved in its processing including the root module which is always resident during execution. In OASIS networks, the first module to be linked to an active terminal is known as the root module. It normally contains the data areas used by other modules, processes messages and data from the terminal, and handles routing to other modules. It is sometimes difficult to find sufficient space for the data areas (i.e. COBOL - working storage) in the root module. This can be remedied to a major extent by making sure that working storage is redefined as much as possible with common information contained in the first portion of working storage. The portion of working storage that is not needed for common usage in the network can be defined as one large area (i.e. 05WS - AREA PIC X (700) VALUE SPACES) and used as the last item. Subsequent modules can use this area by redefining it for specific needs of that module. Care must be taken however, not to lose information through intervening calls of other modules.

In most terminal networks two types of routines can be identified, those which emphasize common functions needed by all phases of the network and those which are unique to a given series of modules. Networks should be written in such a way that these two kinds of routines

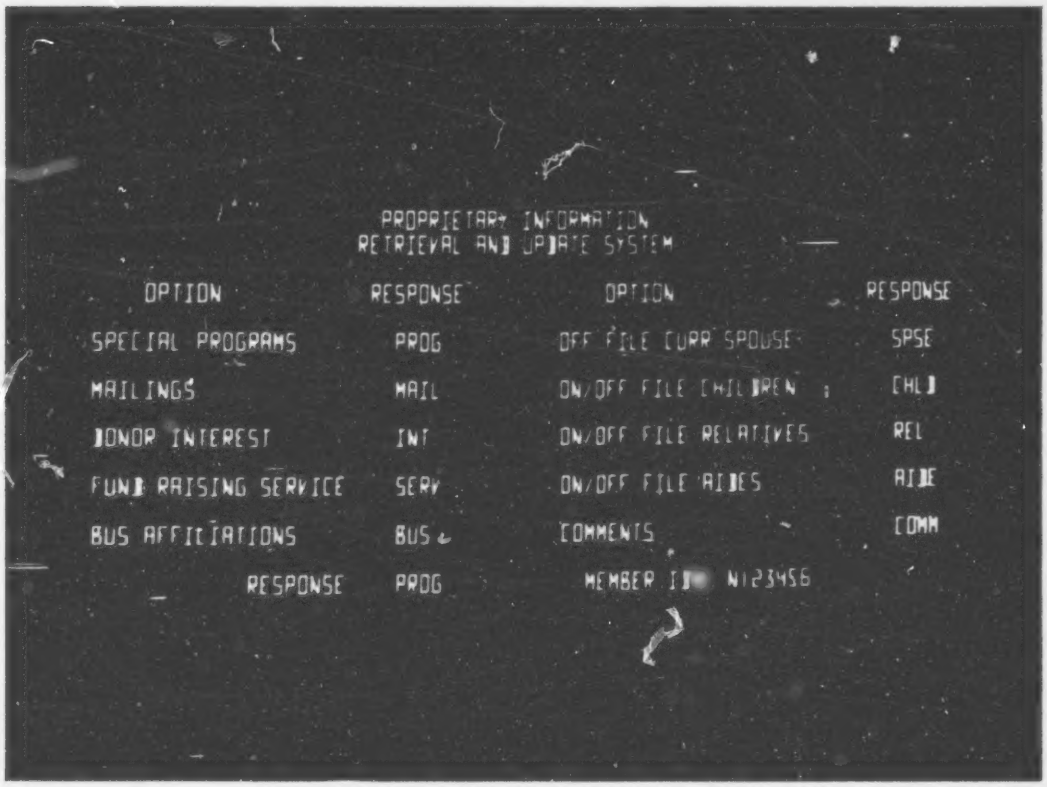
are independent of one another. The common routines are those which involve any kind of I/O activities such as a 'GETSEG' (retrieve data from file) or 'TGET' (accept response from terminal). Specialized routines, on the other hand, involve processing that is peculiar to a given module or modules such as editing a user response during an update.

An important concept to keep in mind when designing a teleprocessing network is to be aware of what the terminal user is seeing and responding to. Uncertainty by the user as to what is happening should be minimized through frequent display of information and error messages. Through both retrieval and updating cycles of a network, it is beneficial to inform the user as to the result of information he has requested or entered; i.e. if information requested cannot be found or if invalid input data is rejected, an appropriate message should be displayed to the user. Also, it is helpful during network development to display the result of any error conditions which result from the file service or terminal service calls. The same area that is to be used by the terminal operator when the network becomes operational can be used by programmers during the development phase. OASIS provides a return code area that carries the result of all file service requests. If the request is in error it is not necessary to terminate the session at the terminal, simply display the return codes and continue with the next response. This technique will assist the programmer during the debugging phase of a network.

The following material illustrates application of the network concept to two typical functions required by the terminal user: the retrieval of a specified segment, and the updating of information contained in the segment. Each procedure is called a cycle, and requires loading and execution of a number of modules, which have been assigned two letter identifiers. A cycle is initiated by a "Send Block" request from the terminal for service, and concludes with the display of new information on the terminal screen. The example is from the portion of the Alumni/Gift network dealing with special program information. After each module completes execution, it branches back to the root module and releases its memory space for the next module required.

Begin Cycle 1 - Retrieval

(1) MODULE-AA: This module performs various initialization and termination routines such as attaching and detaching the user files, and display of the signoff message whenever the end of a terminal session occurs. It begins the retrieval process by displaying the options available to the user. In this case, the user wishes to look at special program information and specifies "PROG" plus the identification number of the person sought, Mr. Sam Smith.



(2) MODULE-AB: This module analyzes the user response and sets up file service parameters for member ID, which is in segment 1. If an invalid response option is detected, the parameters are set up to display this error condition to the user.

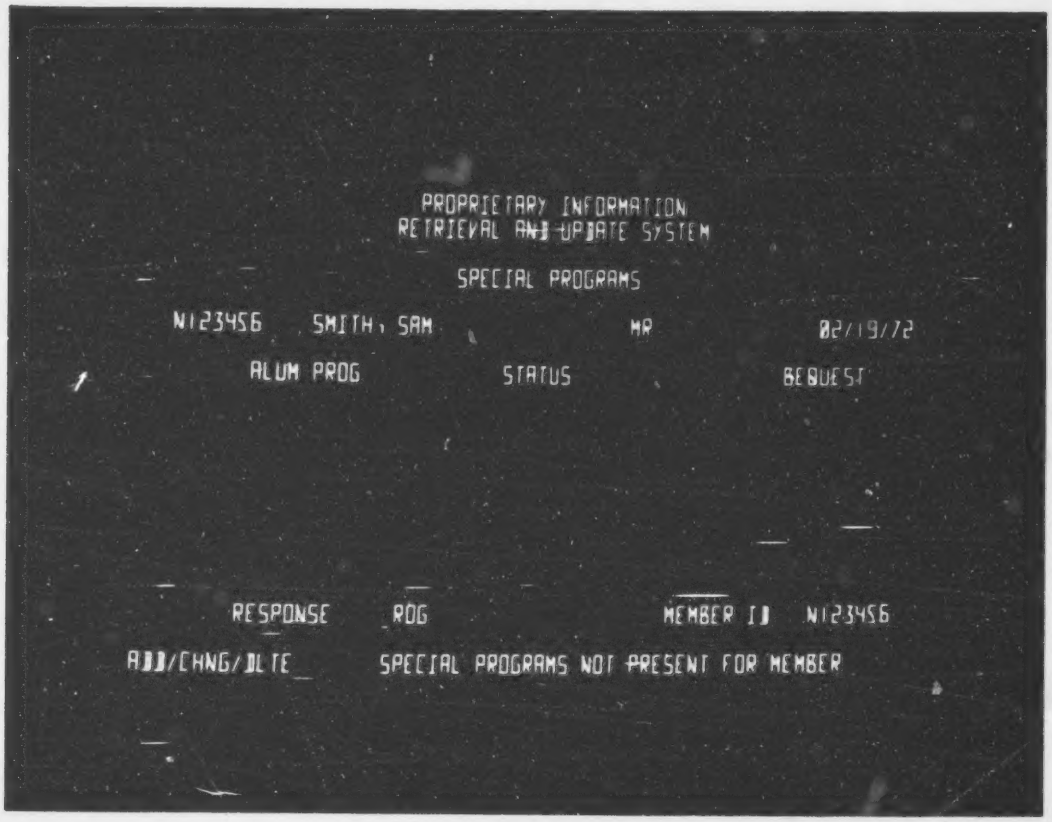
(3) MODULE-AC: This module retrieves segments from the file via the GETSEG (retrieve data from file) call. The parameters for the GETSEG service are already set up when this module is called. When the last occurrence of a given segment is reached, an indicator is set. Subsequent modules test this indicator and follow the appropriate paths.

(4) MODULE-AD: This module checks the return code area from the previous GETSEG call. If the requested ID was found in the file, the ID, name, and title from segment 1 are formatted in the terminal display area. Once this is done, the correct module is selected to retrieve the segment containing the information requested by the user via his response option; i.e., one of ten module names will be set at this time. If ID is not found, an error message is issued.

(5) MODULE-BA: Since PROG was the option chosen by the user, MODULE-BA is entered. Since special programs (segment 102) can occur only once for a given member, the GETSEG parameters for segment 102 occurrence 1 are set up here. The module-name-save area is set to 'BA', since we want to reenter this module to check the results of the GETSEG call for segment 102. Module name is set to 'AC' (common GETSEG). If segment 102 was found for this member, the codes in that segment are placed in the display area with their appropriate expansions. If segment 102 was not found, the message 'SPECIAL PROGRAMS NOT PRESENT FOR MEMBER' is displayed. In this example, segment 102 is not present for the member.

(6) MODULE-BI: Since this particular network has ten different display formats, MODULE-BI analyzes the response the user has requested and preformats the terminal screen. The completed display is shown in step (7), MODULE-AH.

(7) MODULE-AH: This module performs all terminal display functions for the retrieval phase of the GS0502 network. The screen format consists of from 1 to 10 blocks of information. Upon exit from this module, the TGET-indicator is turned on, because a response from the user will be expected, thus ending cycle 1.


PROPRIETARY INFORMATION
RETRIEVAL AND UPDATE SYSTEM
SPECIAL PROGRAMS
N123456 SMITH, SAM MR 02/19/72
ALUM PROG STATUS REQUEST
RESPONSE PROG MEMBER ID N123456
ADD/CHNG/DLTE SPECIAL PROGRAMS NOT PRESENT FOR MEMBER

End CYCLE 1

Begin CYCLE 2 - Update

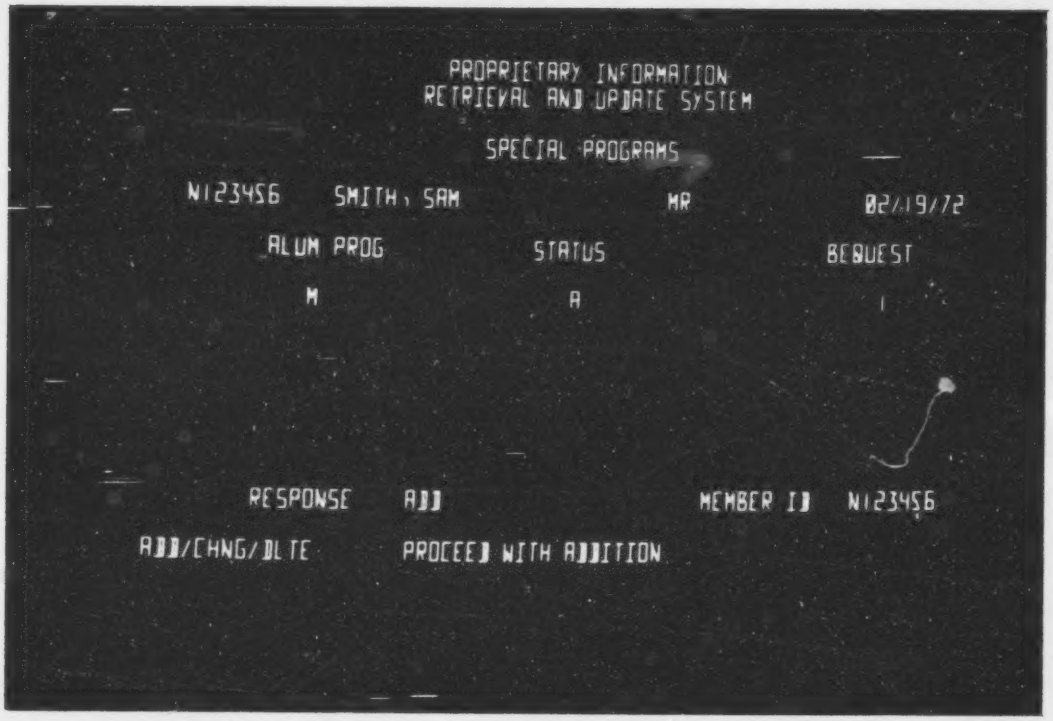
(1) MODULE-AB: Because the TGET-indicator was turned on in MODULE-AH, the TGET function was called in the root module to accept a new user response; cycle 2 begins with this new response.

MODULE-AB again analyzes the response option that was entered and the appropriate module-name is set. In this example, the user entered ADD as his response. Since the previous response was PROG and the member ID has not been changed, the system determines that segment 102 (special programs) is to be added to the current member's record - MODULE-AB sets up the call for MODULE-AI, the update response routing module.

(2) MODULE-AI: This module determines which of the three update responses (ADD, CHNG, DLTE) has been entered. Once this is determined, the module that will analyze whether or not the update request is valid is set. Since there are 10 retrieval options and three update options available to the user, one of 30 updating module routines is set up at this time. In this example, the user desires to add a special programs segment 102 to the current member's record: MODULE-AP is moved to module-name.

(3) MODULE-AP: This module is entered to validate the user's request for adding an occurrence of segment 102 to the current member's record. At retrieval time, it was determined if the segment existed for this member. If it did not exist, the user's request for an addition is valid and the appropriate validation module is set. If it did exist, the response ADD would be considered invalid and the appropriate error message module would be set. If the request had been CHNG or DLTE, the appropriate validation or error message module-name would have been set up according to whether or not the segment existed. In this example, the request for addition is valid and the validation message MODULE-AN is specified.

(4) MODULE-AN: This module issues validation messages to user prompts of ADD, CHNG, or DLTE for various segments being updated in this network. For multiple occurring segments, a line number of 1 through 5 is part of the display. The user need only indicate which line he desires to update. In the case of additions, the next available line number is calculated for the user. In the case of segments which occur only once, such as segment 102, the message 'PROCEED WITH ADDITION' is issued, depending upon the user's update response. In this example, 'PROCEED WITH ADDITION' appears:



(5) MODULE-AR: The major portion of any maintenance program involves the editing of data. MODULE-AR is one of numerous editing modules in the GS0502 network. This particular module edits the special programs codes entered by the user. If any invalid code is encountered in a response area, the error message subscript is set, and the appropriate error message module is called. Upon exit from the error message module, module-name is again set to the edit module needed for the update currently in progress. It is only when all valid codes have been entered that the system will proceed to update the file. If at any point in the editing cycle the user decides he does not want to continue the updating process, the user can respond with an *; this response will result in the options page appearing on the screen, at which point the user may enter a new response.

(6) MODULE-AO: The GS0502 network has the capability of updating 14 different segments; the segment-IO area is redefined as many times as there are different segment types, thereby making it impossible to carry the segment type and occurrence in the segment header area. MODULE-AO is entered in order to determine which segment type is currently being updated so that the proper segment header can be moved to the header-IO area before the updating file services are called.

(7) MODULE-AJ: The actual updating of the file occurs in this module. This particular module performs additions to the file via the ADDSEG service. Other modules handle changes and deletions via calls to the appropriate File Service. All the parameters required for the update services are complete by the time this module is called. In the event the file update is invalid, an error message will be issued specifying the type of error, and the module that accepts a new user response is called. At the same time the file is updated, a transaction tape is written reflecting the old and new information, depending on the update function currently in progress. In this example, the same addition that is used to update the user disc file is reflected on the user logging tape. This tape can be used at a later time to report the user's terminal activities.

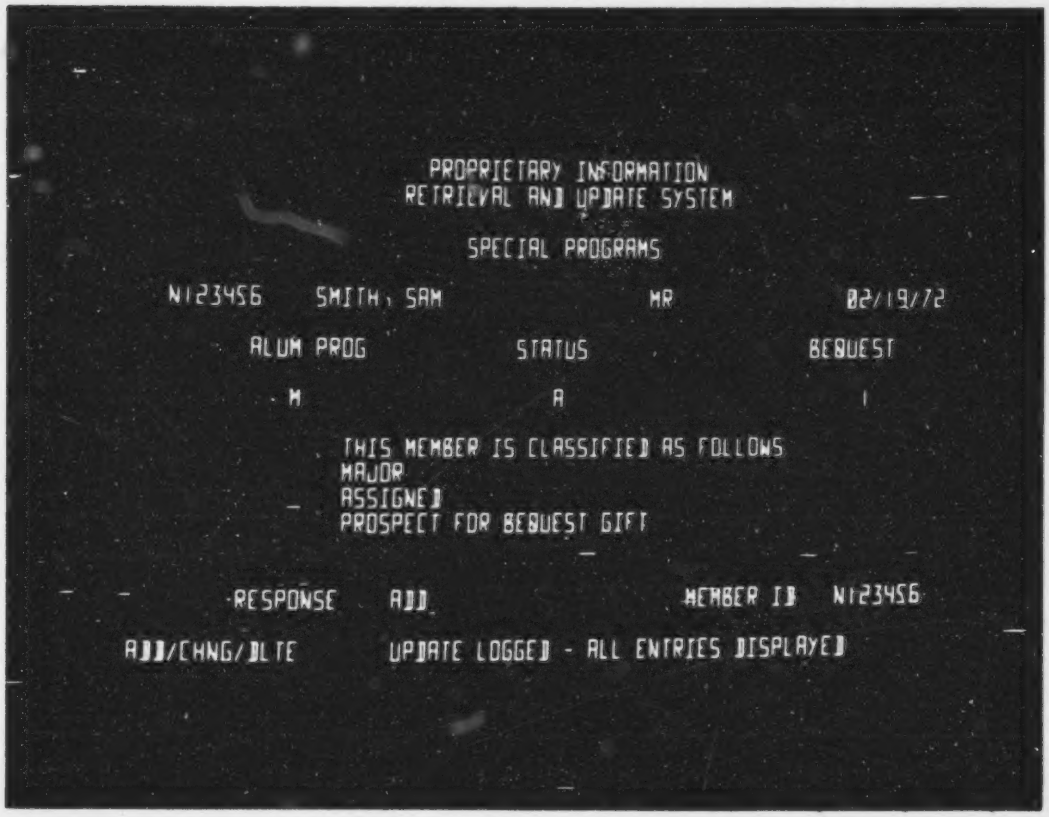
(8) MODULE-AG: With each update of the file, it is necessary to indicate the most recent date on which a segment was altered. Segment 1 in this file carries a last transaction date. This module is entered only when a valid update has occurred in order to replace the existing transaction date with the current date as reflected in the communication region.

(9) MODULE-AF: Once all updating routines have been completed, the procedure for redisplay of the updated segment is initiated. MODULE-AF determines which of the 10 options is currently in progress and sets up the proper redisplay series of modules. In essence, MODULE-AF functions as a redisplay routing analyzer.

(10) MODULE-DO: At this point, the segment chosen by the user via his response options has been updated. MODULE-DO sets up the parameters to retrieve the updated segment. In this example, segment 102 occurrence 1 is retrieved. Upon the original retrieval of this segment in cycle 1, the File Services return code area indicated that the segment was not found. This in turn initiated the user's update routine. The request for segment 102 will now be met with success, and the codes will be formatted with appropriate expansions.

(11) MODULE-AS: Once the codes have been positioned in the display area with their proper expansions, the TPUT routine is called in order to display the information on the terminal screen. In that the basic page format for special programs is already present on the screen, it is not necessary to reissue a TPAGE. Instead, only the blocks of information that reflect the update are displayed; thus, an unnecessary terminal I/O is avoided.

(12) MODULE-ZC: This module is the last module called in the updating sequence. It issues file update verification messages. Upon exit from this module, the TGET-indicator is turned on, since a new response from the user will be requested. The user may request further retrievals or continue updating this segment. The resultant screen appears as follows and completes cycle 2.



End CYCLE 2

Appendix II - Dissemination Activities

A second general introductory workshop on OASIS design principles and operating features was held at M.I.T. at the end of October, 1971. The format was generally the same as that presented in the first workshop at Stanford in January of that year but without the benefit of live terminal demonstrations. The workshop program will be continued during 1972 and 1973, but the emphasis will shift to presentation and discussion of the application systems which are being developed for Stanford use of OASIS. A participant list for the M.I.T. Workshop is at the end of this appendix.

The first volume of OASIS documentation, an Application Programmer's Guide, was issued in August of 1971. This is the second in a sequence of three volumes of planned documentation. The third volume, a System Maintenance Guide, will be published in the summer of 1972, and the final volume, which will contain general design and performance guidelines, will appear during 1973. The addition of a technical writer to the staff in the fall of 1971 has given added impetus to the documentation effort.

A companion to the Application Programmer's Guide is the OASIS Programmer's Reference Booklet. This compact document contains formats and calling sequences frequently referenced by application analysts and programmers. The 16-mm color/sound film "This is OASIS" continues to be in demand for showing in both the United States and Canada.

Three issues of the OASIS Newsletter have been published and distributed to a mailing list of approximately four hundred. The Newsletter is designed as an informal medium of communication concerning OASIS developments at Stanford and elsewhere.

As described in Section 3, considerable effort has gone into training of personnel from a number of other institutions. This program will continue in the future within the limits of project staff availability.

Presentations on OASIS were made to the SIGBDP meeting at the Fall Joint Computer Conference in Las Vegas, the ECS Forum in Denver, the California Educational Computing Consortium in Long Beach and Palo Alto,

and the Electronics Application Research Forum in San Francisco. The SIGBDP meeting presentation is to be published in a forthcoming issue of "Data Base" and has led to OASIS being featured in a forthcoming issue of EDP Analyzer, a leading industry newsletter.

OASIS Workshop Attendees

October 27-28, 1971

Massachusetts Institute of Technology

The American University	Frank P. Rymer, Jr.
Amherst College	David Hornfischer C. Reeves
Babson College	Edgar Canty
Bentley College	Charles C. Ehl Stephen I. Klein
Boston University	W. Doody John Ritchie
Brown University	Eric Brown John S. Duffy
Carnegie Mellon University	Dennis Hill
CAUSE	Charles R. Thomas
Cornell University	Edmund V. Hollenbeck Henry G. Vaughan John P. Wetteran
City College of CUNY	George W. Elder
DePaul University	Robert Birney Glen Harvey
EDUCOM	Len Swanson
Florida State University	James Morgan
The Ford Foundation	Peter DeJanosi
University of Georgia	Harry C. Grothjahn
Harvard University	J. E. Austin D. Farrell Winfield G. Knopf William Mercer Phil Nystrom Thomas O'Brien Ken Shostack
University of Illinois	John Chaney
Indiana University	Herbert Davis Ernest L. Jones Al LeDuc
Indiana University of Pennsylvania	Robert O. Warren
Iowa State University	C. C. Mosier
Ithaca College	Dominic Bordonaro
University of Maine	Michael J. Beauregard
Massachusetts Institute of Technology	Nancy J. Beckley Dan Creasey Kreon Cyros R. Daley J. Grochow John Langell John A. Little Victor Maslov Robert Scott Paul Teplitz
University of Massachusetts (Amherst) (Boston)	Thaddeus J. Los, Jr. Stanley D. Weinstein
Michigan State University	Philip C. Hoffman
University of Montreal	Jacques de Montigny Mrs. Jean Robertson
NCHEMS/WICHE	Michael J. Haight Richard Johnson
University of New Hampshire	Richard Burrows Tom Korst R. R. Ricard, Jr.
New York Institute of Technology	Ward Deustchman
Northern Illinois University	Richard Boris John Hall Robert Karabinus William McKelvey
Pennsylvania State University	Kenneth McCool
St. Joseph's College	Alex Cicchenel
Simmons College	Leonard Soltzbert
University of Southern California	H. E. Matveld
Suffolk University	Paul Ryan
SUNY at Albany	Ronal P. Quake James Vlamis
Stanford University	John W. Gwynn Michael M. Roberts Mrs. Cheryl M. Traver
U. S. Coast Guard Academy	Phillip Boeding
University of Vermont	Pete Purdum Paul Sire Bard F. White
Virginia Polytechnic Institute	Robert E. Taylor

Appendix III - College and University MIS Planning

Introduction. The following material is a partial transcription of the proceedings of a panel discussion on MIS planning conducted during the Project INFO Workshop at the Massachusetts Institute of Technology during October 1971. We are indebted to Landra Miles of M.I.T. for her services in recording the discussion and preparing the transcript.

Participants.

Charles R. Thomas, Executive Director, College and University Systems Exchange (Panel Chairman)

Michael M. Roberts, Director, Management Systems Office Stanford University

Robert H. Scott, Director, Information Processing Services, M.I.T.

Paul W. Sire, Director, Office of Management Information Systems and Computing, University of Vermont

Henry G. Vaughan, Director, Division of Management Systems and Analysis, Cornell University

Presentations.

Mr. Scott:

We have recently formed an Office of Administrative Information Services (OAIS) to bring together the financial data processing of the Institute and other data processing in administrative areas, e.g., personnel, space, etc. The reasons for bringing these different areas together are threefold:

- It enables the Institute to use data describing its status and operations as flexibly and economically as possible.
- It brings about a greater coordination and planning in our systems development activities.
- It enables the Institute to find better ways of analyzing and improving its operations.

In considering the management of administrative data processing and the development of administrative systems, there are several modes of action that

should be avoided:

- Avoid the major upheaval approach. There needs to be a great deal of preliminary groundwork.
- Avoid making changes by dictum from above.
- Do not conduct a great deal of planning at the senior level without also beginning planning activities at the middle level.
- Changes rarely can be contained within a single administrative department; effects on others must be planned for early.

Some approaches that do work include the following:

- Evolution rather than revolution; no organization can handle constant reorganization.
- Any feasible approach must demonstrate both functional and economic gains in the short term; plans with only long term savings get swallowed up in the changing institutional environment.
- A systems development and planning methodology which is based on a coordinated, team effort by both the computer staff and the system users.
- Recognition on the part of presidents and vice-presidents that good management costs something, and that good day to day performance follows only from previous, carefully planned, investment decisions.

Mr. Sire:

At the University of Vermont we have recently completed a comprehensive systems study effort at the departmental level.

Until August of this year, both administrative and academic computing was serviced by an IBM 360/44. In August, an IBM 370/145 with 248K memory was acquired for administrative processing and an XDS Sigma 6 Time-sharing System was installed in support of instruction and research.

Before acquisition of the 145, i.e., in the spring of the year, it was proposed that inter- and intra-departmental information flow within the university be thoroughly analyzed. This was done in the period July-October using IBM's Study Organization Plan (SOP) as the analysis and documentation technique. Our overall goal: new systems and data base design recommendations

in the Student (Admissions, Financial Aid, Counseling and Testing, Student Records, Registration and Reporting), Staff (Personnel, Payroll and Payroll Distribution), and Facilities (inventory and utilization) areas.

The next phase will be design per se within a data management framework. In this regard we have evaluated both IBM's IMS II and OASIS, out of Stanford's Project INFO. IMS was found to be too sophisticated and demanding for our hardware configuration. Thus, we have decided to go with OASIS which is now operational in pilot-test using a subset of our personnel file.

As we move on into new systems design, our initial proposals will include: data base elements and files (e.g., in the student area, the establishment of a cumulative record), macro-flow diagrams, economies, input documents, reporting: scheduled, exception, control and demand (re: demand reporting: the ability for an academic or administrative user to directly inquire into, or format simple reports for quick response from, the student and staff data bases), target dates for operational status, systems staff assignments, and definitional requirements.

I might mention in conclusion that of 29 people, 14 will be assigned to our systems development and implementation effort.

Mr. Roberts:

I am very much in agreement with Bob Scott's comments on good and bad ways to pursue planning, and because you are already hearing so much about OASIS during these two days, I will not elaborate further. However, one point that I believe needs to be made is that it takes time to do good planning, and in the crisis mode in which most universities and all data processing shops operate, time for non-emergency items is a very precious commodity. The computing manager has to make sure his subordinates make time for planning, and he has to make sure he gets support for planning from his superiors.

Mr. Vaughan:

Cornell is in the same hard pressed financial situation as most other universities, with the additional complication of being both publicly supported by the State of New York in some fields of study, and privately supported in the endowed colleges. We are both data poor and system poor, and currently running all types of computing together on a 360/65. We have a requirement

for immediate answers to a number of information problems, as well as the longer run system planning and implementation.

In reviewing various ways of moving ahead from our present situation, we found the following advantages in a data management system approach:

- Integrated file structures
- Modular system building
- Simpler application programs
- Standardized and efficient file manipulations
- Simpler file reorganizations and redesigns
- Evolution to teleprocessing

But such systems also have the following disadvantages:

- Thorough planning required to be efficient
- Interdependency of users causes more definitive management
- Limited system backup

University data files are typically divided into four divisions:

- Personnel information
- Financial information
- Student information
- Alumni information

In planning the reorganization of these data files one must ask what is your data base and decide who is responsible for the data. Usually, the payroll and personnel data files can combine. This leaves student information in a separate data file which provides for students to be transferred into an alumni file when no longer active students.

Mr. Vaughan then went on to explain how he would use these MIS tools to solve problems:

- Design separated from development
- Formal documentation
- Formal buy-offs
- Periodic project reviews
- Formal reports

Mr. Vaughan gave as a case study the reorganization of the student registration system, the last of the 1401 software that remained at Cornell. Although they looked at OASIS, they decided to go with IMS. They started with batch processing with the hope of following this with teleprocessing as soon as possible.

In reorganizing the student registration system, Cornell proceeded in steps:

1. Define the customer.
2. Define the problem as precisely as possible. For this a formal document (User Requirement Specs) was used.
3. Define a feasible overall schedule and get approvals.
4. Define policy questions and get answers.
5. Develop alternative design analysis and decisions.
6. Determine individual software design specifications.
7. Organize development group.
8. Monitor progress and assist customer in preparation.
9. Provide for acceptance testing and "production" status.
10. Perform follow-up analysis (and assistance).

Today the main question is now much teleprocessing, how fast, limited by how much.

Question and Answer Period.

Q. - (for Vaughan): What are your feelings about research, instruction, and administration on one system?

A. - It does not work particularly well. Cornell is actively considering separation.

Q. - (from Roberts to audience): How much time and energy should you expend to keep users with you? Do you feel that: (a) it's about time that users find out about computers---the systems group has to assume a training responsibility in this area; or (b) you are so far ahead of them already that it is a losing proposition---don't bother them with understanding?

A. - (Vaughan): At Cornell the Registrar, Director of Personnel, etc., were formed into a planning board. This has now been replaced by a technical board and a broad policy board. You must talk to the user in the particular area.

(Scott): You must follow the former road. You need middle level understanding. Try bringing together a group to give technical advice but not necessarily representing all the offices, just the people who are really interested.

(Sire): It depends on the people in the university community. Some administrators are keenly interested, but when directly asked what they want in the system, they don't give an answer. You must implement your ideas as director if you are not getting much feedback.

(Audience): You should be able to say to the user, "You tell us your problem as we will analyze it in computer terms." Too often the user attempts to do design himself, with unfortunate results.

Q. - (Thomas to panel): What about advance documentation of costs and benefits of a new system as compared with the old?

A. - (Scott): The greatest problem is that you can make estimates but you tend not to make the savings because of failure in personnel dealings. For example, a secretary who has been there a long time may not be dismissed as intended, which is not a failure in the system.

(Roberts): On any major system, the total cost benefit picture cannot be shown in the beginning. Management has to insist on periodic reporting with validation of savings as the system goes into full operation.

(Sire and Scott): New systems will almost always have a large quality improvement in timeliness, scope of reports, ease of access to data, etc., that is hard to put a price tag on.

(Roberts): As a practical matter, most users will want you to deliver all the improvement you can without significantly raising costs. This means you trade off better hardware and software price performance against systems improvement.

Q. - (Thomas to panel): What about before and after performance audits of systems?

A. - (Vaughan): Although this is desirable theoretically, a more important consideration in new systems today is provision for future expansion. The machine efficiency which was so important in second generation systems has now been eclipsed by people costs of system maintenance and revision. You can save real dollars by giving up some efficiency for more generalized design.

Q. - (from audience): When you are data rich and systems poor, how do you handle data standardization? From the top of the organization down, or the bottom up?

A. - (Scott): Systems design activity tends to bring this problem to the surface;

if it can be solved at the working level fine, but in some cases, particularly where system integration across organizational lines is planned, fairly high levels of management may have to get involved.

(Roberts): In working with applications for OASIS, we found that an anticipated major expansion of data for management "needs" never materialized. If you design a good operating level system, it is likely to hold almost all the information necessary to support managerial analysis and decision needs.

Q. - (from audience): Is it cheaper to standardize data elements as you go or to try to convert the whole system?

A. - (Scott): Try to standardize just at the point in time where a major issue arises. You can create a great deal of unity in a short time if you pick the right time for standardization.

(Roberts): One idea we have used where only some codes in a master file need changing, is to put the file up (using OASIS), and make the changes as part of the first use of the new system. This can save a lot of time and irritation in trying to get into the old file to make changes.

Q - (from audience): How do you feel about attempting to tap expertise on the part of the faculty?

A. - (Roberts): At Stanford we cannot compensate faculty for helping beyond their academic salaries. This puts us in a difficult situation vis a vis the ability of faculty members to accept consulting fees from outside organizations. Faculty committees are not much help either, because of infrequent meetings and crowded agendas.

(audience): Graduate students are a good source of inexpensive talent.

Appendix IV - Application Development Methodology

A project structure has been developed called DIP (Design and Implementation Plan) which specifies the various steps and requirements of a systems project. The objectives of the plan are to:

- Provide a consistent approach to solving systems problems
- Detail the organization and content of system documentation
- Produce documentation as a by-product of development effort
- Facilitate transfer of maintenance between SDG staff members

In this project approach, the user is directly involved in the creation of systems which eventually will support his functional area. Use of DIP promotes user cooperation, and establishes user responsibility for realizing benefits forecast for each system. Thus all users become involved in cost management for projects.

Structuring each project also aids communications and working discipline. At each stage, management presentations, review, and decisions are based on increasing knowledge about the system and on greater certainty of costs and benefits. Units of work are undertaken and controlled in 'chewable bites', and management commits the technical staff to accomplish specific pieces of work at established checkpoints.

When a project reaches the point of intensive technical development, programming, and development of user training, management is carried forward on an exception basis. Before the project's major technical activities are started, objectives are specified and resources are allocated. As long as the project remains within the bounds of these objectives, management need not be brought into the picture for technical details. But by the time a project reaches this stage, its feasibility has been thoroughly established, as has close understanding between users and SDG staff.

As part of the technical specification activity of a system project, standard activities and estimated times are established for the processing of jobs. In arriving at these performance estimates, the computer facility manager and key members of his staff become part

DESIGN AND IMPLEMENTAT

PHASES / FUNCTIONS	1 REQUEST/PROPOSAL		REVIEW	2 FUNCTIONAL REQUIREMENTS		REVIEW	
A USER REQUIREMENTS	Definition of user needs, justification, priority	General statement of the problem		Revised version of general statement of the problem	Analysis of interface with other user areas		O u a m
B SYSTEM DESCRIPTION AND SPECIFICATIONS	Description of user organization, functions, input/outputs	Gross details analyzed Solutions developed Method proposed		Development of flowcharts, data elements, decision tables, glossary of input/outputs, controls, processes, and users manual	Analysis of impact on total system environment Control and audit specifications		S s f n s s t
C DEVELOPMENT AND PRODUCTION COSTS		Gross estimate of development and production costs		Refinement of cost estimates			F o a c
D PROJECT SCHEDULES	Assignment of programmer/ analyst	Gross estimate of project schedule		Refinement of project schedule	Preliminary resource requirements		C m m r
E TESTING AND IMPLEMENTATION				Preliminary conversion, system integration, pilot and parallel testing plans			

DESIGN AND IMPLEMENTATION PLAN CHART

REVIEW	2 FUNCTIONAL REQUIREMENTS		REVIEW	3 SYSTEM SPECIFICATIONS			REVIEW	4 SYSTEM IMPLEMENTATIO AND OPERATION	
	Revised version of general statement of the problem	Analysis of interface with other user areas		Outline of user education and training manuals	REVIEW	User feedback and changes		User manual on use of the system	User review of parallel testing
	Development of flowcharts, data elements, decision tables, glossary of input/outputs, controls, processes, and users manual	Analysis of impact on total system environment Control and audit specifications		System and subsystem flowcharts, narratives, specifications, security techniques		Program general flowcharts, narratives, logic details, keypunch instructions		Programming	Final system and run documentatic
	Refinement of cost estimates			Final estimate of development and production costs		Estimate of conversion costs — Costs, timings, volumes by program			Review of operational costs
	Refinement of project schedule	Preliminary resource requirements		Commitment of manpower and machine resources		Review of development schedule and manpower allocation →			Processing time and operations schedule
	Preliminary conversion, system integration, pilot and parallel testing plans					Final conversion and testing plans		System integration and pilot testing	Conversion Parallel testing

FIGURE IV-1: Design and Imp

MENTATION PLAN CHART

	REVIEW	3 SYSTEM SPECIFICATIONS			REVIEW	4 SYSTEM IMPLEMENTATION AND OPERATION		REVIEW	5 SYSTEM EVALUATION
		Outline of user education and training manuals	REVIEW	User feedback and changes		User manual on use of the system	User review of parallel testing		Review of system objectives
ns		System and subsystem flowcharts, narratives, specifications, security techniques		Program general flowcharts, narratives, logic details, keypunch instructions		Programming	Final system and run documentation		Review of program efficiency and maintenance requirements
		Final estimate of development and production costs		Estimate of conversion costs	Costs, timings, volumes by program		Review of operational costs		Review of cost effectiveness
		Commitment of manpower and machine resources		Review of development schedule and manpower allocation →			Processing time and operations schedule		
				Final conversion and testing plans		System integration and pilot testing	Conversion Parallel testing		

FIGURE IV-1: Design and Implementation Plan

of the system project team in much the same way that the user does in establishing system objectives and identifying potential benefits. In the case of standard activities and estimated times for computer jobs, schedules and routines are subject to adjustment when the work is operational in much the same manner in which standards are revised for manufacturing jobs after a product is in production. However, it is basic to the project technique that processing costs be estimated closely before the system is implemented.

As indicated in Figure IV-1 (preceding page), the Design and Implementation Plan is organized into five phases which ensure an orderly progression in the development and implementation of a system over a period of time.

Phase 1, Request/Proposal: A potential need for computer service arises, and this potential need is discussed by the user and an analyst assigned by SDG. When these preliminary discussions establish that the need appears feasible to meet with a computer system, SDG assigns a project number and a project leader to the request. All further development work is performed under this number, and all documents refer to it.

The project leader and the user then detail the definition, requirements, objectives, justification, priority, and environment of the problem. The project leader analyzes the various methods which could be utilized to solve the problem, estimates costs of each, and selects the one he feels is best suited. These details comprise a "proposal" which is first subjected to internal review and then presented to the user.

If the proposal is accepted, the project leader is authorized to develop functional specifications for the project:

Phase 2, Functional Requirements: The proposal is used to develop functional specifications which describe in detail the method to be used in meeting the objectives of the proposal. The project leader prepares these specifications in close cooperation with the user.

They are then submitted for approval. If approved, the project

leader is authorized to proceed with more detailed specifications.

Phase 3, System Specifications: The approved functional specifications provide the framework for design of the system. The SDG project leader identifies logically related processes within the system and, using this information, designs system and program specifications. The design considers the restraints of timing, processing requirements, costs, and effective computer utilization. As the system specifications are developed, procedures for using the system are provided to the groups responsible for its use and operation.

Upon approval of this phase, the design is frozen. That is, changes to the approved system will not be made without considering their impact on the cost and implementation schedule of the system. Changes which are considered desirable but not necessary for the implementation are documented and filed in the system "Wishbook."

Phase 4, System Implementation and Operation: Programs are written and tested. Complete instructions for producing the system outputs are prepared and given to computer operations staff. These include scheduling, operating, controlling, output handling, and delivery. Any necessary file conversions are performed, and a parallel test is made. A final estimate of production cost is made.

The user reviews the results of the parallel test and the final cost estimate. If he is satisfied with these, the system becomes fully operational.

Phase 5, System Performance and Evaluation: Within three to six months after implementation, an appraisal is made of the performance of the system in meeting the objectives set forth during the original definition of requirements phase. If the performance fails to meet the design objectives, appropriate changes will be made before the system is released to routine production. The evaluation should also measure the actual cost of development compared to the planned cost for historical purposes and for the benefit of those managing the project.

At this time, the project is considered complete.

Appendix V - Background Note on Project INFO and OASIS

In the spring of 1968, the Ford Foundation granted Stanford University $700,000 to be used over three years to support the work of Project INFO (Information Network for Operations) in the design and testing of an integrated computer system for university administration. Previous studies had shown that at Stanford, as well as at many other universities, (1) the full capabilities of computer equipment and programs were not being utilized to support the needs of administrative offices and top management, and (2) computer support was becoming more and more critical to successful operation of the institutions. Although the problems leading to this situation were numerous, Stanford felt that most could be solved if given a substantial commitment of resources to perform the necessary design and development tasks. The University was particularly anxious to proceed with the project because a number of years of substantial investment in administrative computing had already produced major improvements in several areas, particularly alumni development and financial management. Even though these improvements were significant, the demands of management for support had outrun the capability of the computer and systems then in use. During 1966-67, a five-man study team was formed to investigate the requirements for broader and more comprehensive administrative computer support, and to analyze the system features necessary to meet them. The planning document which resulted from the study concluded that an integrated system was feasible within the limitations of third generation computer technology and delineated the following major requirements for such a system:

(1) A single machine file of computer readable data combining existing independent computer and manual files,

(2) a logical file structure which allowed data definition and retrieval independent from its physical representation or location in the machine file,

(3) remote terminal access to files and processing programs, and

(4) a generalized inquiry and report generation capability to

handle management oriented, non-routine needs for information.

Although feasible, the creation of such a system required answers to many technical computer systems questions that only intensive study could provide. Further, it was impossible to determine the specific operating costs of such a system in advance, and this would clearly have a major impact on its effectiveness in financially hard pressed colleges and universities. Taking these and other considerations into account, Stanford initiated a proposal for development of such a system and requested assistance from the Ford Foundation. Specifically, Stanford proposed a full scale pilot study to design and test such a system, to develop guidelines and techniques for its use, and to disseminate the results of the study widely to institutions of higher education. Although the system was designed to support all administrative computer requirements, it was considered essential to concentrate effort initially in those areas which most acutely needed support at Stanford and which also had a major impact on the flow of university resources. Accordingly, the proposal assigned priority to development of systems for Student Services, Alumni, Personnel, Accounting, Purchasing, and Institutional Self Study.

Following the grant award, a project team was formed and rapid progress was made toward development of specific design approaches to an integrated system. An evaluation was begun to determine whether any existing data management system could provide the breadth of support sought within the proposed computer configuration. On a parallel basis, work proceeded to define the data base* requirements of the different application areas.

As the data management system evaluation effort proceeded, it became apparent that there was a basic dichotomy in the systems being

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*A large computer file of information is usually referred to as a "data base", carrying the connotation that it contains all necessary information to perform specified processing and reporting requirements. An integrated file scheme such as that adopted by Project INFO is also commonly known as the "data base approach" to systems design.

surveyed. Those which were able to operate on medium sized computers such as might be expected to be available to university administrators lacked sufficient capability to support the INFO design objectives, and those systems which did meet the objectives contained many features which were superfluous to the needs of university administration and resulted in machine requirements which the INFO staff considered to be beyond the reach of all but a few schools. This discovery had a fundamental impact on the subsequent course of the project during the grant period because it led to the decision to design a new data management system tailored to the specific requirements of the university administrative environment and to the general economic constraints operating in that environment. Subsequent to the completion of the design, a major software development effort was initiated to write and test the programs necessary to implement the design in an operational system. This effort, which required allocation of the greater part of project resources during 1969 and 1970, produced OASIS (Online Administrative Information System).

In OASIS, data is stored on a random access disc device in a manner which allows sequential processing to meet volume output requirements. In addition, the data base has multiple access points to facilitate random retrieval and maintenance. Security of confidential information is maintained at the data element level as well as at the higher segment, record, and file levels.

Online video terminal support includes both tailored and general services. The tailored services consist of COBOL or Assembly language application programs created for specific office functions. Two general services, Query and Report Generator, permit file inquiry and the quick specification and production of reports.

The heart of the system is the OASIS file service which accepts requests from higher level programs and translates them into detailed manipulations of the data base. Requests can refer to data items by name, without regard to their location within a record, providing a high degree of disengagement from data base layout. It is thus possible to deal with the data logically without regard to record organization.

The concept of the "total" system described in the original INFO proposal has been implemented in OASIS by providing for standard physical representation of data in the computer files, and for uniform methods of inserting, removing, and changing data. Although OASIS handles all data presented to it in the same way, the system is structured to provide for the logical integrity and security of data according to the specific requirements of administrative users. Each user controls his own data base and retains responsibility for its validity, but the system treats all data identically from a machine standpoint. Through a system of data dictionaries, a user has access not only to his data, but also to that of any other user to which he has been granted access.

Following successful testing of the prototype version of OASIS in the Fall of 1970, development of designs for use of the system in the Student, Alumni/Gift, and Employee areas was accelerated, and plans were adopted for conversion of existing manual and computer systems in these areas to OASIS. Detailed information on functional capabilities of the new designs is contained in Section 2 of this report.

By the summer of 1971, nearing the end of the initial three year grant period, many project objectives, particularly those relating to design and development of an integrated computer system had been achieved. However, OASIS was still not in production use at Stanford, and was under test at only one other computer installation. Additional funds were requested from the Ford Foundation to assist in completion of four major applications at Stanford, to study and evaluate the performance of the system in operation, and to continue to support the use of OASIS at other institutions. A renewal grant award of $190,000 for two years through August, 1973, are as follows:

Task Description	Estimated Man-months of Effort
Complete Development of Student System	48
Complete Development of Alumni/Gift System	36
Complete Development of Employee System	60
Develop Budget System	48
Support OASIS Development and Maintenance	48
Support OASIS Installation at Other Institutions	24
Study OASIS Performance	12

Appendix VI - OASIS Data Element Dictionaries

The following pages contain data element dictionaries for three OASIS applications now under development at Stanford - Student, Alumni/-Gift, and Employee. The elements and their definitions are those which presently appear to be necessary to meet operational and analysis requirements of users, and are subject to future change as the systems go into production and are evaluated.

The OASIS file structure requires that data be defined at the record, segment, and data element levels. Data elements are of fixed length. Segment definitions specify a fixed length, but up to 255 different segment types may be defined, each of a different length if desired. Records are composed of defined numbers of segments, which may or may not be actually present in the record. This method produces a significant reduction in file size requirements over conventional fixed length record schemes without incurring the overhead of full variable length treatment of data.

In the dictionaries, data elements are shown in order within the segments in which they are defined. Segments are shown in the order in which they appear in each record. The data element names are those used in OASIS Generalized Services and application networks for retrieval and update purposes. Elements for which it is planned to create separate value index tables to facilitate rapid retrieval are shown with a "Y" in the right hand column.

The length of each data element in bytes (eight bits) is indicated. The physical representation of the data in the online file is shown according to the following type descriptions:

B = Binary
C = Character
Z = Zoned Decimal
P = Packed Decimal

The choice of type for each data element is usually a result of study of processing requirements, particularly the extent of the need for arithmetic manipulation.

OASIS DATA ELEMENT DICTIONARY - STUDENT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
1		*Segment 1, containing basic identification data, occurs once per student. It is one of three required segments, the others being segments 13 and 142.*			
1.1	MEMBER.ID	Ten position student identification. Uniquely identifies the student in the OASIS Student file. It is formatted as follows: 0 - QYY - NNNNNN where 0 = always zero for ID future expansion QYY = Matriculation QYY (Quarter and Year) NNNNNN = Serially assigned number	C	10	Y
1.2	MEMBER.NAME	Student's name formatted: Last, First, Middle	C	23	Y
1.4	SEX.CODE	Two values: M = Male and F = Female	C	1	
1.5	MARITAL.STATUS	Two values: M = Married and S = Single	C	1	
1.6	BIRTH.DATE	Date of Birth - Format: Year, Month, Day Format Display: Month, Day, Year	C	6	
1.7	DATE.LAST.TRANS	Date last time the student record had activity. File Format: Year, Month, Day Display Format: Month, Day, Year	P	6	
1.8	NAME.TYPE	Format of Name. One format for all student records. Code 0 = Last, First, Middle	C	1	
1.10	RECORD.TYPE	One value - S. All students that are on the file.	C	1	
1.11	UPD.ACTIVITY	Indicates latest type of activity on a particular student.	C	1	
2-3		*Reserved for future use.*			
4		*An optional segment containing information about special names.*			
4.1	PREFERRED.NAME	Legal Name - for names longer than 23 positions.	C	30	
5		*An optional recurring segment containing information about prior names.*			
5.1	OTHER.NAME	Maiden name.	C	23	
5.2	OTHER.TYPE	Same as 1.8 - one code only 0.	C	1	
5.4	OTHER.NAME.CODE	Value = 1 for Maiden Name.	C	1	
5.5	OTHER.NAME.DATE	Format: Year, Month, Date name changed.	C	4	
6		*An optional segment containing information about parent or guardian.*			
6.1	GUARDIAN.NAME	Name of parent/guardian. Format: Last name, First, Middle, suffix.	C	23	
7		*An optional segment pertaining to emergency contact.*			
7.1	EMERG.NAME	Emergency party name. Format: Last Name, First, Middle, suffix.	C	23	
8-10		*Reserved for future use.*			
11		*An optional recurring segment containing information on local address.*			
11.1	LOCL.ADDR	Local Address - Street Number and Name and Apt. Number or Residence Hall and Room Number. Only one occurrence can be input.	C	24	
12		*An optional segment about local city.*			
12.1	SPEC.CITY.1	Local City Name. One element optional segment.	C	19	

OASIS DATA ELEMENT DICTIONARY - STUDENT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
13		*One of three required segments for each student's record.*			
13	ZIP.1	Local ZIP code - zeros if ZIP code is unknown.	C	5	
14		*Reserved for future use.*			
15		*A one element optional segment.*			
15.1	TEL.NO.1	Local Telephone Number.	P	7	
16-20		*Reserved for future use.*			
21		*A one element optional recurring segment.*			
21.1	HOME.ADDR	Home Address Street Location. A one element optional recurring segment. Only one occurrence can be input.	C	24	
22		*An optional recurring segment containing Home City and Home State. One occurrence (line) is permitted as input.*			
22.1	SPEC.CITY.2	Home City.	C	19	
22.2	ST.CODE.2	Home state - 2 positions (official postal service abbreviations)	C	2	
23		*Optional segment containing two elements only one of which is used.*			
23.1	ZIP.2	Home Address ZIP Code.	C	5	
24		*A one element optional segment.*			
24.1	TEL.AREA.CODE.2	Home Telephone Area Code.	P	3	
25		*A one element optional segment.*			
25.1	TEL.NO.2	Home Telephone Number.	P	7	
26-30		*Reserved for future use.*			
31		*A one element coptional recurring segment where only one occurrence can be permitted as input.*			
31.1	GARD.ADDR	Parent/Guardian Address - Street Location.	C	24	
32		*A two element optional recurring segment where only one occurrence can be input.*			
32.1	SPEC.CITY.3	Parent/Guardian City.	C	19	
32.3	ST.CODE.3	Parent/Guardian State - 2 positions (official postal service abbrev.)	C	2	
3.		*An optional segment containing two elements only one of which is used.*			
33.1	ZIP.3	ZIP code of Parent/Guardian Address.	C	5	
34		*A one element optional segment.*			
34.1	TEL.AREA.CODE.3	Parent/Guardian Telephone Area Code.	P	3	

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SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
35		*A one element optional segment.*			
35.1	TEL.NO.3	Telephone Number of Parent/Guardian.	P	7	
36-40		*Reserved for future use.*			
41		*A one element optional recurring segment.*			
41.1	EMRG.ADDR	Emergency Party Street Address. Only one occurrence permitted as as input.	C	24	
42		*A two element optional recurring segment where only one occurrence is used.*			
42.1	SPEC.CITY.4	City Name of Emergency Party Address.	C	19	
42.2	ST.CODE.4	State abbreviation of Emergency Party Address.	C	2	
43		*An optional segment of 2 elements only one of which is used.*			
43.1	ZIP.4	ZIP Code of Emergency Party Address.	C	5	
44		*A one element optional segment.*			
44.1	TEL.AREA.CODE.4	Area Code of Telephone Number for Emergency Party Address.	P	3	
45		*A one element optional segment.*			
45.1	TEL.NO.4	Telephone Number of Emergency Party Address. If Stanford extension, first three digits are 000. When displayed/printed EXT will be used.	P	7	
46-49		*Reserved for future use.*			
50		*A one element optional segment.*			
50.1	BOX.NO.STANFORD	University Post Office Box Number. Usually used by students living in residences where mail cannot be delivered.	C	4	
51-53		*Reserved for future use.*			
54		*An optional segment containing Address Similiarity indicators.*			
54.1	H.SIM	Home = Local. Code = L.	C	1	
54.2	G.SIM	Parent/Guardian = Local or Home. Code = L or H. or = Local & Home. Code = L.	C	1	
54.3	E.SIM	Emergency = Local or Home or Parent. Code = L,H,P. or = Local & Home. Code = L. or = Local & Parent. Code = L. or = Home and Parent. Code = H.	C	1	
55-70		*Reserved for future use.*			
71		*An optional recurring segment summarizing academic achievements to be used for Alumni Records.*			
71.1	ACD.LEVEL	Academic achievement level upon leaving Stanford. Not used by the Registrar's Office.	C	1	
71.2	ACD.SCHOOL	School to which student belonged upon leaving Stanford.	C	1	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
71.3	ACD.MAJOR	Major of student upon leaving Stanford.	C	3	
71.4	ACD.YEAR	Calendar year in which student left Stanford.	C	4	
71.5	ACD.DEG.QTRS	Degree Code or Number of quarters a student stayed in above major upon leaving Stanford.	C	3	
71.6	ACD.ACH.QTR	Quarter (Fall, Winter, Spring, or Summer) that a student left Stanford.	C	1	
72-73		*Reserved for future use.*			
74		*An optional recurring segment containing one occurrence for each residence where student leved.*			
74.1	RESIDENCE.CODE	All residence codes of Residence Halls in which student lived while attending Stanford. The last occurrence indicates his latest residence code (the current residence code if he is currently registered).	P	3	
74.2	QYY.RESIDED	Date in Quarter and Year format (QYY) in which the student lived at the residence.	P	3	
75-141		*Reserved for future use.*			
142		*One of three required segments which must occur only once. It contains latest academic and registration status.*			
142.1	MAJOR	3-digit code, the left most is the school. Major codes in Table 101; School Codes in Table 102.	C	3	Y
142.2	AR.FLAG	Values: A - Advance Registered D - Registered on Reg Day	C	1	Y
142.3	LQR	Last quarter, in QYY format, in which the student registered.	P	3	Y
142.4	CLASS	Academic Class - 1 - Freshman 2 - Sophomore etc. Codes in Table 103.	C	1	Y
142.5	ACT.RLG	Religious Activity indicator.	C	1	
142.6	RPREF	Religious Preference. Codes in Table 105.	C	2	
142.7	DEGREE.CAND	Code that indicates if student applied for a degree - B - Undergraduate Degree G - Graduate Degree	C	1	
142.8	FUTURE.REG.PLANS	Indicates in which future quarter student intends to register. Codes in Table 106.	C	1	Y
142.9	ADV.CODE	Advisor Code for student whose major is undeclared.	C	2	Y
142.10	STUDENT.TYPE.REG	Codes that indicates if student is an honors co-op, overseas registrant, etc. Codes in Table 107.	C	2	Y
142.11	REG.TYPE	Indicator - 1 = Old Returning 3 = New Student 2 = Continuing 4 = None of the above	C	1	Y
142.12	CLASS.ORG	Indicates initial admission class.	C	1	
142.13	HOLD.IND	Indicates if any hold notices exist for this student. Holding department codes are in a separate recurring segment.	C	1	
143		*Optional segment containing country of citizenship. All foreign students would have this segment as part of their record on the OASIS Student File.*			
143.1	COUNTRY.CODE	Indicates country of citizenship for foreign students.	P	3	Y

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
143.2	VISA.TYPE	Under what basis student entered U.S. - foreign students only.	C	1	
144		*An optional recurring segment containing history of prior majors. One occurrence per major.*			
144.1	QYY.PR.MAJ	Date of previous School and Major enrollment in QYY format.	P	3	
144.2	MAJ.PR	Previous School and Major in which student was enrolled.	C	3	
145		*An optional recurring segment that contains summary fee information. One occurrence per quarter.*			
145.1	TCODE	Tuition code for a specific quarter.	C	2	Y
145.2	AMT.TUITION	Assessment or Payment Amount of Tuition.	P	4	
145.3	RES.CODE	Residence Hall code where student lives on campus. Off campus residents are coded 000.	P	3	
145.4	RENT.ROOM	Rent charges for above residence code.	P	3	
145.5	PLAN.BOARD	Code for one of several Board Plans offered by Food Services.	C	1	
145.6	BRD.FEE	Cost of Board Plan per quarter.	P	3	
145.7	ADD.CHG.CD	One of several combination codes reflecting type of other charges.	C	2	
145.8	AMT.OTH	Total amount of other charges.	P	3	
145.9	LATE.FEE	Late Fee charges.	P	3	
145.10	CASH	Amount of net cash for a specific quarter paid by student. Includes 2 decimal positions.	P	6	
145.11	GRANTS	Net amount of total grants awarded to student for a specific quarter. Carried to 2 decimal places.	P	6	
145.12	DEFERRED	Net amount deferred per quarter carried to 2 decimal positions.	P	6	
145.13	DATE.TRANS	Date of latest fee transaction for a specific quarter. Format is Year, Month, and Day.	P	6	
145.14	QYY.FEE	Date is QYY format for which fees apply.	P	3	
145.15	BATCH.NO	Batch Number of latest Fee transaction that updated this quarterly activity.	P	3	Y
145.16	DUES.H	House Dues.	P	3	
146		*An optional recurring segment containing detail transactions. One occurrence per transaction.*			
146.1	TCODE.D	Detail activity Tuition Code can occur, more than once per quarter, as many times as it changes.	C	2	
146.2	AMT.TUITION.D	Amount of tuition paid - detail activity.	P	4	
146.3	RES.CODE.D	Residence Code changes activity within a qaurter.	P	3	Y
146.4	RENT.ROOM.D	Room charges activity.	P	3	
146.5	PLAN.BOARD.D	Board plan changes activity.	C	1	
146.6	BRD.FEE.D	Boarding Fee detail activity.	P	3	
146.7	ADD.CHG.CD.D	Detail activity of additional charges.	C	2	
146.8	AMT.OTH.D	Detail activity of amount charged for additional charges code.	P	3	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
146.9	LATE.FEE.D	Late Fees.	P	3	
146.10	CASH.D	Cash paid to cashier as a result of a Fee transaction.	P	6	
146.11	GRANTS.D	Grants-in-aid amount--detail activity within a quarter. Reflects total amount of various grants.	P	6	
146.12	DEFERRED.D	Deferment Amount Activity.	P	6	
146.13	CHANGE.RET.D	Change returned by cashier after a fee transaction is handled. Usually student pays more fees than assessed so that he can have some change returned in cash.	P	6	
146.14	REFUND.D	Refunds by cashier due to a tuition reduction. Usually happens after registration activities.	P	6	
146.15	DATE.TRANS.D	Transaction date--Format: Year, Month, Day.	P	6	
146.16	QYY.DEE.D	Date in QYY format for which this Fee transaction applies.	P	3	Y
146.17	BATCH.NO.D	Batch No. to which fee transaction belonged.	P	3	Y
146.18	OBN	Old batch number for control purposes.	P	3	
146.19	DUES.H.D.	House Dues detail.	P	3	
147		*An optional segment indicating place of birth.*			
147.1	BIRTH.LOCATION	Indicates place of birth. A one element optional segment.	C	24	
148		*An optional segment that occurs for students living on campus.*			
148.1	QYY.RES	Effective date of residence in QYY format.	P	3	
148.2	NICK.NAME	Used by housing office as all elements of this segment are.	C	12	
148.3	RES.LST	Previous residence--for control purposes when updating.	P	3	
148.4	RES.CUR	Current Residence Code. Codes and Rates in Table 112.	P	3	Y
148.5	ROOM.NO	Room number.	C	4	
148.6	BILL.CODE	Used in conjunction with Residence code to modify bills for some students.	C	1	
148.7	PLAN.B	Board plan selected by student.	C	1	
148.8	DPST.NO	Used by housing office for control purposes.	P	6	
149-50		*For future use. An unused optional segment defined as one element.*			
151		*A recurring segment that contains the cumulative courses taken by a student.*			
151.1	QYY.CRSE	Date, in QYY format, a course is taken.	C	3	
151.2	CRSE.SC	9 position field that does include Dept. Number, Course Number, Suffix, and Section-- Format xxx xxx x xx.	C	9	Y
151.3	UNITS	Credit Units.	Z	2	
151.4	GRADE	Grade Earned.	C	2	
151.5	RQYY	Quarter and Year (QYY format) in which a grade is revised.	P	3	
151.6	OGRADE	Original grade.	C	2	

OASIS DATA ELEMENT DICTIONARY - STUDENT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
154		*An optional segment that contains summary credit units.*			
154.1	QUP	Last Quarter's Units Passed.	P	3	Y
154.2	UTG	Units towards graduation--used only for Undergraduates and co-terminal students. Includes Units Transferred.	P	3	Y
154.3	LGU	Cumulative units for courses with grades A, B, C, D.	P	3	
154.4	LGI	Cumulative-Letter Grade Indicator--for possible future use. Format 9.99 (similar to Grade Point Average).	P	3	
154.5	CUT	Non-Stanford Units Passed--Transferred from another school.	P	3	
155		*A segment with only one possible occurrence used to record Admission data about undergraduates.*			
155.1	INST.CODE.SECOND	High School or College Institution Code for entering Freshmen and Transfers.	C	6	
155.2	MAJ.TR	Prior School and Major Code in which transfer student was enrolled.	C	3	
155.3	TYPE	Type of institution from where student came. Public or Private.	C	1	
155.4	GPA.TR	Prior GPA (orequivalent of GPA) of Transfer student.	P	3	
155.5	CTY.HS	Usually reflects the county of residence.	P	3	
155.6	VRB.SAT	SAT Verbal Score.	P	3	
155.7	MATH.SAT	SAT Math Score.	P	3	
156		*An optional segment that contains Admission Information about entering Graduates. One occurrence per each previous institution attended.*			
156.1	INST.CODE.COLLGE	Institution Code--first two positions blank.	C	6	
156.2	MAJ.C	Major at previous institution.	C	3	
156.3	GPA.C	GPA or equivalent at previous College or University.	P	3	
156.4	FGQ	QYY in which a Stanford undergraduate started his graduate work.	P	3	
156.5	DEG.C	Degree obtained from prior institution.	C	3	
156.6	MYY.DEG	Date degree obtained in Month (1 position) and Year format.	C	3	
157		*An optional segment for graduate students containing GRE scores.*			
157.1	VRB.G	GRE Verbal Score.	C	3	
157.2	QNT.G	GRE Quantitative Score.	C	3	
157.3	AA.G	GRE Advanced Area Code.	C	3	
157.4	SCR.AA.G	GRE Advanced Area Score.	C	3	
158		*A one element optional segment.*			
158.1	ORIG.STUDENT.ID	Original Student ID-8 positions. A one element optional segment used for conversion into the Student System.	C	8	Y
159		*A one element optional recurring segment.*			
159.1	TR.COMMENTS	Comments to be printed on Transcript. Can have more than one line. A one element optional recurring segment.	C	46	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
160		*A one element optional recurring segment.*			
160.1	GEN.COMMENTS	General comments not used for Transcripts. A one element optional recurring segment.	C	46	
161					
161		*An optional recurring segment that includes the student's courses taken for Fall Qtr.*			
161.1	QYY.CRSE.1	Date in QYY format a course was taken. This is always Fall Qtr for any year.	C	3	
161.2	CRSE.SC.1	See 151.2-CRSE.SC (Dept. Number, Course Number, Suffix, Section).	C	9	Y
161.3	LINE.1	Used internally (by a program) to update grades. Line number of a student on a class list.	C	2	
161.4	SQ.1	Usage same as LINE.1 Page Number for a specific course or a class list	C	2	
161.5	UNITS.1	Credit Units	Z	2	
161.6	GRADE.1	Grade posted on class list.	C	2	
161.7	RQYY.1	Quarter and Year in which original grade was revised.	P	3	
161.8	OGRADE.1	Original grade.	C	2	
162		*Same definition as segment 161, but for Winter Quarter Courses.*			
162.1	QYY.CRSE.2	See 161.1	C	3	
162.2	CRSE.SC.2	See 151.2-Dept. Number, Course Number, Suffix and Section.	C	9	Y
162.3	LINE.2	See 161.3	C	2	
162.4	SQ.2	See 161.4	C	2	
162.5	UNITS.2	See 161.5	Z	2	
162.6	GRADE.2	See 161.6	C	2	
162.7	RQYY.2	See 161.7	P	3	
162.8	OGRADE.2	See 161.8	C	2	
163		*Same definition as segment 161, but for Spring Quarter Courses.*			
163.1	QYY.CRSE.3	See 161.1	C	3	
163.2	CRSE.SC.3	See 151.2-Dept. Number, Course Number, Suffix, Section.	C	9	Y
163.3	LINE.3	See 161.3	C	2	
163.4	SQ.3	See 161.4	C	2	
163.5	UNITS.3	See 161.5	Z	2	
163.6	GRADE.3	See 161.6	C	2	
163.7	RQYY.3	See 161.7	P	3	
163.8	OGRADE.3	See 161.8	C	2	
164		*Same definition as segment 161, but for Summer Quarter Courses.*			
164.1	QYY.CRSE.4	See 161.1	C	3	
164.2	CRSE.SC.4	See 151.2-Dept. Number, Course Number, Suffix, Section.	C	9	Y

OASIS DATA ELEMENT DICTIONARY - STUDENT FILE

SEG NO. ELEM NO	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
164.3	LINE.4	See 161.3	C	2	
164.4	SQ.4	See 161.4	C	2	
164.5	UNITS.4	See 161.5	Z	2	
164.6	GRADE.4	See 161.6	C	2	
164.7	RQYY.4	See 161.7	P	3	
164.8	OGRADE.4	See 161.8	C	2	
165		*Same definition as segment 161, but for temporary storage.*			
165.1	QYY.CRSE.5	See 161.1	C	3	
165.2	CRSE.SC.5	See 151.2-Dept. Number, Course Number, Suffix, Section.	C	9	Y
165.3	LINE.5	See 161.3	C	2	
165.4	SQ.5	See 161.4	C	2	
165.5	UNITS.5	See 161.5	Z	2	
165.6	GRADE.5	See 161.6	C	2	
165.7	RQYY.5	See 161.7	P	3	
165.8	OGRADE.5	See 161.8	C	2	
170		*An optional recurring segment used to contain information about Holding Departments.*			
170.1	DPT.HOLDING	Code of Department placing a hold on Registration.	C	3	Y
170.2	AMT.DUE	Amount due if any.	P	7	

OASIS DATA ELEMENT DICTIONARY - ALUMNI/GIFT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
1		*Segment 1 occurs once per member. It contains basic data such as Name and Identification.*			
1.1	MEMBER.ID	Member Number.	C	10	
	ALUM.ID	Seven position number, including check digit that redefines MEMBER.ID.	C	7	Y
1.2	MEMBER.NAME	Name of member; formatted according to the code shown in NAME.TYPE (element 1.8).	C	23	
	MEM.NAME	Twelve position field redefining member.	C	12	Y
1.3	MEMBER.TYPE.IN	Name for indexing description of the type of member this member name and number represent. Excludes Value 'I'.	C	1	Y
	MEMBER.TYPE.UN	Same as 1.3, includes all Values.	C	1	
1.4	SEX.CODE	A code describing member's sex.	C	1	
1.5	MARITAL.STATUS	A code designating marital status of member.	C	1	
1.6	BIRTH.DATE	Birthdate of member when it is known.	C	6	
1.7	LAST.TRANS.DATE	Day of the update on which a change was made to member's record.	P	4	
1.8	NAME.TYPE	Format code of a member name governing access and printing.	C	1	
1.9	TITLE.CODE	Title codes for Mr., Mrs., Miss, Dr., Ms.	C	1	
1.10	RECORD.TYPE	Indicates member is in another OASIS file. (for future use)	C	1	
2		*Reserved for possible future use.*			
3		*This is an optional segment. It contains information about special names.*			
3.1	SPEC.TITLE	Title other than Mr., Mrs., Miss, Dr., Ms or blank. When present, it is used without exception for all listings and labels.	C	8	
4		*This is an optional segment, containing information about special names.*			
4.1	PREFERRED.NAME	Contains name in preferred printing format (24 character maximum). It is used in those cases where MEMBER.NAME contains the format required for correct alphabetizing but not preferred for addressing.	C	30	
5		*This is an optional recurring segment, containing information about prior names.*			
5.1	OTHER.NAME	Name by which member was formerly known.	C	23	
	OTH.NAME	Redefines OTHER.NAME for indexing.	C	12	Y
5.2	OTHER.NAME.TYPE	Indicates the formatting of this other name.	C	1	
5.3	OTHER.TITLE.CODE	The correct title associated with this other name.	C	1	
5.4	OTHER.NAME.CODE	Defines the type of name contained in this segment. i.e. maiden, former legal, etc.	C	1	
5.5	OTHER.NAME.DATE	Year and month that this other name was recorded.	C	1	
6		*Reserved for future use.*			
7		*Reserved for future use.*			

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
8		*An optional segment containing information about special status.*			
8.1	ACT.STATUS.IN	Codes that indicate a special mailing status of the member of the file. Excludes Value '3'.	C	1	Y
	ACT.STATUS.UN	Includes all codes for ACT.STATUS.	C	1	
9		*An optional segment containing information about member's relationship to Stanford.*			
9.1	UNIVERSITY.REL	A code indicating the member's relationship to Stanford.	C	2	Y
10		*Reserved for future use.*			
11		*Segment containing primary mailing address.*			
11.1	ADDRESS.1.LINE	Line of primary mailing address. Line recurs.	C	24	
12		*Reserved for future use.*			
13		*Contains ZIP code of first address.*			
13.1	ZIP.1	Zip code of the primary mailing address (P.O. actual for domestic addresses, S.U. assigned for foreign addresses). It is required, and when address becomes unknown this zip will be coded '00000'; cannot be deleted.	C	5	
13.2	GEOG.AREA.1	Geographic code that represents a section or area as defined by the University. When zip code is entered, area is established by the system from the zip table file.	C	3	Y
14		*Contains telephone area code.*			
14.1	TEL.AREA.CODE.1	Telephone area code for this telephone number.	P	2	
15		*Contains telephone number.*			
15.1	TEL.NO.1	Telephone number for this address.	P	4	
16		*Contains telephone number extension number.*			
16.1	TEL.EXCH.1	If present, represents the extension at which this person may be reached at this address.	P	3	
17-20		*Reserved for future use.*			
21		*Segment containing first line of second mailing address.*			
21.1	ADDRESS.2.LINE	Lines of address for secondary home address. Lines recur.	C	24	
22		*Reserved for future use.*			
23		*Contains second address ZIP code.*			
23.1	ZIP.2	Zip code of the address location and city/state segment. It is the actual US Post Office zips for domestic addresses.	C	5	
23.2	GEOG.AREA.2	Geographic code that represents the section or area as defined by the University.	C	3	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
24		*Contains telephone area code for second address.*			
24.1	TEL.AREA.CODE.2	The telephone area code for this phone number.	P	2	
25		*Contains telephone number for second address.*			
25.1	TEL.NO.2	The telephone number for this address.	P	4	
26		*An optional segment which contains telephone extension at telephone number of second address.*			
26.1	TEL.EXCH.2	If present, represents the extension at which this person may be reached at this address.	P	3	
27-30		*Reserved for future use.*			
31		*Segment containing first line of third mailing address.*			
31.1	ADDRESS.3.LINE	Lines of addresses for primary business. Lines recur.	C	24	
32		*Reserved for future use.*			
33		*Contains third address ZIP code.*			
33.1	ZIP.3	Zip code of the address location and city/state segments. They are the actual US Post Office zips for domestic addresses.	C	5	
33.2	GEOG.AREA.3	Geographic code that represents the section are area as defined by the University.	C	3	Y
34		*Contains telephone area code for third address - optional.*			
34.1	TEL.AREA.CODE.3	Telephone area code for this phone number.	P	2	
35		*Contains telephone number of third address - optional.*			
35.1	TEL.NO.3	Telephone number for this address.	P	4	
36		*An optional segment which contains telephone extension at telephone*			
36.1	TEL.EXCH.3	If present, represents the extension at which this person may be reached at this address.	P	3	
37		*Contains identification of business or corporation shown in first line of primary business address.*			
37.1	BUS.1.MEMBER.ID	ALUM.ID for the business or corporation shown in the first line of the primary business address.	C	7	Y
37.2	BUS.1.POSITION	Represents the position held by this member for this Business ID.	C	10	
37.3	BUS.1.MATCHING	Indicates the company represented in this segment has a gift matching program.	C	1	
38-40		*Reserved for future use.*			
41		*Segment containing first line of fourth mailing address.*			
41.1	ADRESS.4.LINE	Lines of addresses for Secondary Business address. Lines recur.	C	24	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
42		*Reserved for future use.*			
43		*Contains fourth address ZIP code.*			
43.1	ZIP.4	Zip code of the address location and city/state segments. They are the actual US Post Office zips for domestic addresses.	C	5	
43.2	GEOG.AREA.4	Geographic code that represents the section or area as defined by the University.	C	3	
44		*Contains telephone area code for fourth address.*			
44.1	TEL.AREA.CODE.4	Telephone area code for this phone number.	P	2	
45		*Contains telephone number for fourth address.*			
45.1	TEL.NO.4	The telephone number for this address.	P	4	
46		*Represents the extension at which a person may be reached at fourth address.*			
46.1	TEL.EXCH.4	If present, represents the extension at which this person may be reached at this address.	P	3	
47		*Identification of secondary business or corporation.*			
47.1	BUS.2.MEMBER.ID	ALUM.ID for the business or corporation shown in the first line of the secondary business address.	C	10	Y
47.2	BUS.2.POSITION	The position held by this member for this Business ID.	C	10	
47.3	BUS.2.MATCHING	The company represented in this segment has a gift-matching program.	C	1	
48-50		*Reserved for future use.*			
51		*Segment repreeenting a ZIP code area in which an alumni club operates.*			
51.1	ALUMNI.CLUB	A code that represents a zip area in which an alumni club operates.	C	2	Y
52-54		*Reserved for future use.*			
55		*Contains ID of school or department associated with a particular mailing.*			
55.1	ORG.ID	A code used to identify the school or department associated with this organization mailing.	C	1	
55.2	ORG.LIST.ID	A code to identify which mailing list in this organization this member is identified with.	C	1	
	ORG.ID.AND.LIST	Redefines 55.1 and 55.2 for Indexing.	C	2	Y
55.3	ORG.MULTI.COPY	The number of copies this member desires of a specific mailing.	C	2	
55.4	ORG.ADD.PREF.HM	Code specifying the address to which this mailing is to be sent, if not to 'normal' (1st) business address.	C	1	
56		*Indicates exception to a usual 'home' address mailing.*			
56.1	ADD.PREF.HOME	Indicates an exception to a usual 'home' address mailing (i.e., when primary home address is not to be used in requests for 'home address' mailings).	C	1	

OASIS DATA ELEMENT DICTIONARY - ALUMNI/GIFT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
56.2	ADD.PREF.BUS	Indicates an exception to a usual 'business' address mailing (i.e., when primary business address is not to be used in requests for business address mailings).	C	1	
56.3	ADD.PREF.OBSVR	The address to which the Observer/Almanac is to be sent.	C	1	
56.4 56.5 56.6	ADD.PREF.BULK.2 ADD.PREF.BULK.3 ADD.PREF.BULK.4	Addresses to which future bulk mailings may be sent. (Expansion)	C	1	
57-59		*Reserved for future use.*			
60		*Optional segment containing ID, TYPE if member on other OASIS file.*			
60.1	OTH.MEMBER.ID	The ID number of member who has a different ID number in another OASIS file.	C	10	
60.2	OTH.MEMBER.TYPE	Other file in which this person resides under another ID number.	C	1	
61		*Optional segment containing ID, TYPE if spouse is on other OASIS files.*			
61.1	FAM.REL.ALUM.ID	Member ID of the current spouse of this member, who is a member of the OASIS files.	C	7	Y
61.2	FAM.RELATION	Relation code for this member ID.	C	1	
61.3	FAM.RECORD.TYPE	The other OASIS file of which this Spouse is a member.	C	1	
62-69		*Reserved for future use.*			
70		*Optional segment containing basic Alumni Assoc. and degree data.*			
70.1	BAS.ALUM.ASSOC.IN	Code which defines this member's status with the Alumni Association. Excludes Value '0'.	C	1	Y
	BAS.ALUM.ASSOC.UN	Same as 70.1 - includes all Values.	C	1	
70.2	BAS.SOC.CL.YEAR	The year to be considered this member's social class year. This is normally the year in which an undergraduate would graduate or has graduated.	C	2	
70.3	BAS.DEG.UG	Member's undergraduate academic achievement at the University.	C	1	
70.4	BAS.DEG.GRAD	The status of member's graduate achievement at the University.	C	1	
	BAS.DEG.STATUS	Redefines 70.3 and 70.4 for indexing.	C	2	Y
71		*An optional recurring segment summarizing achievement to be used for alumni records.*			
71.1	ACD.LEVEL	Represents the level of achievement.	C	1	
71.2	ACD.SCHOOL	The school in which this member did his academic work in the major indicated.	C	1	
71.3	ACAD.MAJOR	The academic major of this member.	C	1	
	ACD.SCHL.MAJOR	Redefines 71.2 and 71.3 for indexing.	C	3	Y
71.4	ACD.YEAR	The year in which this level of achievement was completed.	C	4	
71.5	ACD.DEG.QTRS	Number of quarters completed or the degree conferred on this member.	C	3	
72		*Optional recurring segment, contains indicators as defined by the organization.*			

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
72.1	STANFORD.ORG.ID	A code which identifies the organization (school/dept.) for which this information is being maintained.	C	1	Y
72.2 THRU 72.10	STANFORD.ORG.1 THRU STANFORD.ORG.9	Flags which contain codes specific to the organization represented in the ID.	C	1	
73		*Optional recurring segment, contains type and length of service.*			
73.1	STANF.SRV.ORG.ID	A code that identifies the organization (school/dept.) associated with this service.	C	1	Y
73.2	STANF.SRV.CODE	A code that indicates kind of service to this organization (school/dept.).	C	1	
73.3	STANF.SRV.FREQ	Number of years of service of this member to this organization.	C	1	
73.4	STANF.SRV.LAST.YR	The year this member last served in this capacity.	P	3	
74		*An optional recurring segment containing one occurrence for each residence where student lived.*			
74.1	RESIDENCE.CODE	On-campus or overseas campus residence for this member.	C	3	
74.2	QYY.RESIDED	Field containing the quarter and year (last two positions) this member resided at this residence.	P	2	
75		*Optional recurring segment, contains code identifying student act.*			
75.1	STUDENT.ACTIVITIES	Records volunteer and extra curricular activities while member was a student.	C	4	
76		*Optional segment, contains code identifying current occupation.*			
76.1	OCCUPATION	Records the member's occupation.	C	4	
77-99		*Reserved for future use.*			
100		*This segment indicates the amount of gifts that file member has given in current year, last year, and in total to the University.*			
100.1	DNR.STAT.TOTAL	The range in which total gifts to the University from this member would fall.	C	1	
100.2	DNR.STAT.CURR.YR	Range in which current year's gifts from this member would fall.	C	1	
100.3	DNR.STAT.LAST.YR	The range in which last year's gifts from this member would fall.	C	1	
	DNR.STAT.TCL.IN	Redefines 100.1, 100.2, and 100.3 for indexing. Excludes Value '00A'.	C	3	Y
	DNR.STAT.TCL.UN	Redefines 100.1, 100.2, and 100.3 to include all values.	C	3	
100.4	DNR.STAT.FREQ	Number of fiscal years in which this member was a donor.	C	1	
101		*This segment identifies certain annual solicitation methods through which file member is solicited for gifts to the University.*			
101.1	AF.PROGRAM.ID	Code to identify the Annual Fund Programs to which this member belongs.	C	1	Y
101.2	AF.PROGRAM.STAT	Special status of the member of this Annual Fund program.	C	1	
101.3	AF.PROG.ADDR	Address code to indicate Campaign Region selection.	C	1	
101.4	AF.DATE	Date indicating date added to program.	C	4	

OASIS DATA ELEMENT DICTIONARY - ALUMNI/GIFT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
102		*This segment identifies special membership in solicitation program.*			
102.1	SPEC.ALUM.PROG	Codes that indicate this member's special ALUM.PROG membership.	C	1	Y
102.2	SPEC.ALUM.STAT	Code indicating the current status in the SPEC.ALUM.PROG.	C	1	Y
102.3	SPEC.ALUM.BEQ	A flag that when set, indicates this member is a prospect for a bequest.	C	1	
103		*This segment indentifies the various schools from which a member may receive solicitation.*			
103.1	FUND.ID	A code which indicates the fund for which this segment exists.	C	1	
103.2	FUND.YR	Social class year of this member's school affiliation.	C	2	
	FUND.ID.YR	Redefines 103.1 and 103.2 for indexing.	C	3	Y
103.3	FUND.PROS.TYPE	Optional information defining prospect groups within the fund.	C	1	
103.4	FUND.CUR.RATING	Code representing the range in which current year's gifts to this fund from this member would fall.	C	1	
103.5	FUND.LAST.RATING	Code representing the range in which gifts by this member in last year prior to the current year would fall.	C	1	
103.6	FUND.TTL.RATING	Code representing the range in which total gifts by this member to this fund would fall.	C	1	
103.7	FUND.PREF.FLAG	The preferred fund for member at this time.	C	1	
103.8	FUND.SPEC.HAND	Flag which, when set, indicates this fund member should not be solicited for this fund at this time.	C	1	
104		*This segment identifies a donor's interest in the University pertinent to fund raising.*			
104.1	DONOR.INTEREST	Code showing interest of the member as a prospect.	C	2	Y
104.2	DONOR.PURPOSE	Purpose of interest as shown by gift purpose.	C	2	
	DONOR.INT.PURP	Redefines the interest of this member.	C	4	
104.3	DONOR.GIFT.FLAG	Flag which, when set, indicates this member has been a donor to this interest.	C	1	
105		*Reserved for future use.*			
106		*This segment indicates special volunteer service to the University.*			
106.1	FUND.SVC.CODE	Fund-raising organization service group with which this member is associated.	C	2	Y
106.2	FUND.SVC.EFFORT	Special effort within the fund service group with which this person is associated.	C	1	
106.3	FUND.SVC.YR	The year member was enlisted in this service.	P	3	
107		*This segment records the status of a member of gift campaign prospect group.*			
107.1	PROSP.CMP.ID	This is a code which represents the campaign ID in which this person is a prospect.	C	2	
107.2	PROSP.AREA.STRUC	Area-region, team number, and volunteer number to which member is assigned.	C	10	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
	PROSP.ID.AREA	Redefines 107.1 and 107.2 for indexing.	C	5	Y
107.3	PROSP.REPORT.CDE	Results of a volunteer call upon this campaign prospect member.	C	1	Y
107.4	PROSP.MARR.CODE	Flag which, when set, indicates that this campaign prospect has a spouse on the OASIS file who is considered with the prospect as a campaign donor and prospect.	C	1	
107.5	PROPS.GFT.AMOUNT	Amount of gift credited to this campaign.	P	7	
107.6	PROPS.UPD.PLEDGE	Amount of unpaid pledge credited to this campaign.	P	7	
108		*This segment identifies volunteer activity within a gift campaign.*			
108.1	VOL.CMP.ID	Campaign prospect ID (and gift source) this volunteer is assigned to.	C	2	
108.2	VOL.AREA.STRUCT	Area-region, team number, and volunteer number assigned volunteer.	C	10	
	VOL.ID.AREA	Redefines 108.1 and 108.2 for indexing.	C	5	Y
108.3	VOL.LEVEL	Title and level of responsibility at which this volunteer is working in this campaign.	C	1	
109		*This segment records the historical data of volunteer activity of a member.*			
109.1	VOL.HIST.CMP.ID	Same codes as those used for campaign volunteer.	C	2	
109.2	VOL.HIST.LEVEL	Title and level of responsibility at which this volunteer is working in this campaign.	C	1	
109.3	VOL.HIST.FREQ	The number of years this volunteer has worked in this program at this level.	C	1	
109.4	VOL.HIST.DATE	Last date of service for this volunteer in this program at this level.	P	3	
109.5	VOL.HIST.RATING	Code used by campaign and program staff managers to rate the effectiveness of a volunteer.	C	1	
110		*This segment records institutional proposals for follow-up purposes pertinent to fund raising.*			
110.1	PROJ.FOL.UP.ID	Type of institution to which this proposal was made.	C	1	
110.2	PROJ.FOL.UP.RATG	Evaluation of this institution according to capitalization.	C	2	
110.3	PROJ.FOL.UP.INT	The 'interest' for which this proposal has been made.	C	3	
110.4	PROJ.FOL.UP.STAT	Code containing the status of this proposal.	C	1	
110.5	PROJ.FOL.UP.DATE	The date this proposal was submitted.	C	4	
110.6	PROJ.FOL.UP.MEMB	Flag indicating if this institution is a part of an Annual Fund program.	C	1	
111		*This segment indicates this member should receive no University gift solicitation.*			
111.1	DO.NOT.SOLICIT	Flag which, when set, indicates the person should not be solicitated.	C	1	Y
112		*This segment indicates the business affiliations of a member.*			
112.1	BUS.AFF.NAME	Name of a business with which this member is associated.	C	23	
112.2	BUS.AFF.MBR.ID	Member ID of this business.	C	10	
	BUS.AFF.ALUM.ID	Redefines member ID for indexing.	C	7	Y

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
112.3	BUS.AFF.POS	The position member holds in this company.	C	10	
112.4	BUS.AFF.MATCH	Flag which, when set, indicates that this business has a gift-matching program.	C	1	
113		*Reserved for future use.*			
114		*This segment records the name of the member's non-alumnus spouse.*			
114.1	OFF.SPOUSE.NAME	Name of this member's current spouse who is not a member of an OASIS file.	C	23	
114.2	OFF.SPOUSE.CODE	Code that indicates that this spouse is the current spouse of this member.	C	1	
115		*This segment cross references the member's alumni or current student children.*			
115.1	CHILD.MEMBER.ID	MEMBER.ID of a child of this member who is also a member of an OASIS file.	C	10	
	CHILD.ALUM.ID	Redefines 115.1 for indexing.	C	7	Y
115.2	CHILD.CODE	Code which identifies this child.	C	1	
116		*This segment records the names of a member's children who are non-alumni.*			
116.1	OFF.CHILD.NAME	Name of a child who is not a member of an OASIS file.	C	23	
116.2	OFF.CHILD.TITLE	Title associated with this off-file child.	C	8	
116.3	OFF.CHILD.CODE	Code which identifies this child.	C	1	
117		*This segment cross reference alumni relatives of the member.*			
117.1	REL.MEMBER.ID	MEMBER.ID of a relative or special related person who is also a member of the OASIS file.	C	10	
	REL.ALUM.ID	Redefines 117.1 for indexing.	C	7	Y
117.2	REL.DESC	A description of this relationship.	C	10	
118		*This segment records names of non-alumni relatives of a member.*			
118.1	OFF.REL.NAME	Name of a relative who is not a member of an OASIS file.	C	23	
118.2	OFF.REL.TITLE	Title of this off-file relative.	C	8	
118.3	OFF.REL.DESC	Description of the relationship to this member.	C	10	
119		*This segment cross references associates of this member who are alumni.*			
119.1	ASSOC.MEMBER.ID	MEMBER.ID of an associate who is also a member of an OASIS file.	C	10	
	ASSOC.ALUM.ID	Redefines 119.1 for indexing.	C	7	Y
119.2	ASSOC.DESC	A description of the association.	C	10	
120		*This segment records names of non-alumni associates for a member.*			
120.1	OFF.ASSOC.NAME	The name of an assoicate who is not a member of an OASIS file.	C	23	
120.2	OFF.ASSOC.TITLE	The title of this associate.	C	8	

OASIS DATA ELEMENT DICTIONARY - ALUMNI/GIFT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
120.3	OFF.ASSOC.DESC	A description of this association.	C	10	
121		*This segment records a pledge of money to be given to the University by a member.*			
121.1	PLEDGE.SOURCE	Campaign or project effort that generated this pledge.	C	2	
121.2	PLEDGE.DATE	The date in format YYMDD that this pledge was recorded with Stanford.	C	6	
121.3	PLEDGE.AMOUNT	Unpaid balance of this pledge.	P	7	
121.4	PLDG.ACCT.NO	Fund account number to which this pledge is to be credited.	C	16	
121.5	PLEDGE.NUMBER	Number which identifies this pledge.	C	5	Y
121.6	PLEDGE.1ST.PAYDY	A date (YYMDD) that the pledge payment is due from this member.	C	4	
121.7	PLEDGE.FREQ	Frequency of reminders to be sent this member for his pledge payment.	C	1	
121.8	PLEDGE.PAYMT.AMT	Amount of each pledge payment.	P	7	
121.9	PLEDGE.SPEC.HAND	Code which specifies the handling of pledge reminders.	C	1	
121.10	PLEDGE.A.MATIC	Flag which indicates that this pledge is on an automatic bank withdrawal system.	C	1	
122		*This segment summarizes gifts prior to 1960 for this member.*			
122.1	GIFT.SUM.VOL	Number of gifts represented by this summary.	B	2	
122.2	GIFT.SUM.DATE	Date of the last gift in this summary in the format YYMDD.	C	6	
122.3	GIFT.SUM.AMT	The sum of all gifts summarized in this record.	P	7	
123		*This segment records each gift received from a member since 1960.*			
123.1	GIFT.SOURCE	Campaign or effort that generated gift.	C	2	
123.2	GIFT.DATE	Date that gift was received by Stanford.	C	6	
	GIFT.SOURCE.YY	Defines source and year for indexing.	C	4	Y
123.3	GIFT.AMOUNT	Amount of the gift.	P	7	
123.4	GIFT.ACCT.NO	Indicates to which fund account this gift is credited.	C	16	
123.5	GIFT.TAG.NO	The serial number of the gift acknowledgement.	C	5	
123.6	GIFT.ANON	Flag indicating that this gift should be kept externally anonymous.	C	1	
123.7	GIFT.DECEMBER	Flag to indicate that this is a December gift received in January.	C	1	
123.8	GIFT.TYPE	Type of gift that has been posted to member's record.	C	1	Y
123.9	GIFT.BY.OTHER	A flag which, if present, indicates gift was received from a donor other than member.	C	1	
124		*Optional recurring segment, contains transactions of pledge (seg 121).*			
124.1	PLDG.TRANS.NO.PY	Number assigned to this pledge in the file.	C	5	
124.2	PLDG.TRANS.AMT	Amount paid on this pledge number.	P	7	
124.3	PLDG.TRANS.DATE	Date of this payment on the pledge was made.	P	4	
124.4	PLDG.TRANS.NO	Number of cash transactions ticket.	C	5	

OASIS DATA ELEMENT DICTIONARY - ALUMNI/GIFT FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
125		*Optional recurring segment; summary of gifts for each fund per member*			
125.1	FD.GFT.ID	Identifies which fund income is summarized.	C	1	
125.2	FD.GFT.CURR.YR	Summary of fund income for current year.	P	7	
125.3	FD.GFT.LAST.YR	Summary of fund income for last year.	P	7	
125.4	FD.GFT.YR.LESS.2	Summary of fund income two years ago.	P	7	
125.5	FD.GFT.YR.LESS.3	Summary of fund income three years ago.	P	7	
125.6	FD.GFT.TOT	Summary of fund income in total.	P	7	
126		*Optional segment; summary of gifts for this member.*			
126.1	TOT.GFT.CURR.YR	Total gifts to the University by this member in current year.	P	7	
126.2	TOT.GFT.LAST.YR	Last year's gifts in total by this member to the University.	P	7	
126.3	TOT.GFT.YR.LESS.2	Total gifts to the University by this member two years ago.	P	7	
126.4	TOT.GFT.YR.LESS.3	Total gifts to the University by this member three years ago.	P	7	
126.5	TOT.GFT.TOT	Total gifts to the University by this member.	P	7	
127-34		*Reserved for future use.*			
135		*Optional recurring segment; additional information for this member.*			
135.1	SIV.COMMENTS	A free-form non-coded field in which information may be added to a member's record.	C	30	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
1		*Segment 1 containing basic identification data, occurs once per employee.*			
1.1	MEMBER.ID	Social security number, preceded by a Z.	C	10	Y
1.2	MEMBER.NAME	Name of employee formatted: Last, First, Middle.	C	23	
	MEM.NAME	First 12 digits of MEMBER.NAME. Redefines MEMBER.NAME.	C	12	Y
1.3	SEX.CODE	Employee's sex.	C	1	Y
1.4	MARITAL.STATUS	Marital status of employee.	C	1	
1.5	BIRTH.DATE	Birth date of employee.	Z	6	Y
1.6	LAST.TRANS.DATE	Day of the update on which a change was made to employee's record.	P	4	
2-4		*Reserved for future use.*			
5		*This is an optional recurring segment, containing information about prior names.*			
5.1	OTHER.NAME	Name by which employee was formerly known.	C	23	
5.2	OTHER.NAME.CODE	Type of name contained in segment.	C	1	
5.3	OTHER.NAME.DATE	Year and month that other name was recorded.	C	4	
6		*Reserved for future use.*			
7		*An optional segment relative to emergency contact.*			
7.1	EMERG.NAME	Name of the person that should be contacted in emergency for employee.	C	23	
8-10		*Reserved for future use.*			
11		*A recurring segment containing home address.*			
11.1	HOME.ADDRESS	1st occurrence: street address. 2nd occurrence: city and state.	C	24	
12		*Reserved for future use.*			
13		*Contains ZIP code of home address.*			
13.1	ZIP.1	ZIP code of home address. Cannot be deleted; zeros if ZIP code is unknown.	C	5	Y
14		*Reserved for future use.*			
15		*Contains telephone number at home address.*			
15.1	TEL.NO.1	Telephone number at home address.	P	4	
16-40		*Reserved for future use.*			
41		*Recurring segment containing emergency contact address.*			
41.1	EMERG.ADDRESS	1st occurrence: street address 2nd occurrence: city and state	C	24	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
42		*Reserved for future use.*			
43		*Contains emergency address ZIP code.*			
43.1	ZIP.4	Emergency address ZIP code.	C	5	
44		*Reserved for future use.*			
45		*Contains telephone number at emergency address.*			
45.1	TEL.NO.4	Telephone number at emergency address.	P	4	
46-53		*Reserved for future use.*			
54		*An optional segment containing address similiarity indicator.*			
54.1	ADD.SIM.FLAG.1	Indicates that home and emergency address are the same.	C	1	
55-59		*Reserved for future use.*			
60		*Optional recurring segment containing identification number of employee in another five.*			
60.1	OTH.MEMBER.ID	The ID number of an employee in another file for inter-file reference.	C	10	
60.2	OTH.MEMBER.TYPE	Other file to which this person resides under another ID number.	C	1	
61		*Optional segment containing family relationship information.*			
61.1	FAM.REL.MEM.ID	Identification number of family member who is in this or another OASIS file.	C	10	
61.2	FAM.RELATION	Relation code for family member.	C	1	
61.3	FAM.RECORD.TYPE	OASIS file in which the family member resides.	C	1	
62-70		*Reserved for future use.*			
71		*An optional segment summarizing academic achievement at Stanford.*			
71.1	ACD.LEVEL	Level of academic achievement at Stanford.	C	1	
71.2	ACD.SCHOOL	School in which employee was enrolled for work in major indicated.	C	1	
71.3	ACD.MAJOR	Major field of study at Stanford.	C	2	
71.4	ACD.YEAR	The year in which this level of achievement was completed.	C	4	
71.5	ACD.DEG.QTRS	Number of quarters for degree conferred on employee by Stanford.	C	3	
71.6	ACD.ACH.QTR	School quarter in which the academic level was achieved.	C	1	
72-190		*Reserved for future use.*			
191		*A required segment containing basic employment dates and employee status indicators.*			
191.1	PAYROLL.GROUP	Regular or casual employee status or type of employee relationship to Stanford.	C	1	Y

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
191.2	PR.SUPPL.CODE	Designates that employee was paid this payroll on a supplemented payroll.	C	1	
191.3	EMPL.START.DATE	Date that employee relationship started with Stanford.	P	4	Y
191.4	EMPL.START.CODE	Type of hiring status of employee.	C	2	Y
191.5	EMPL.ADJ.ST.DATE	Employment start date as adjusted by leaves or previous employment status.	P	4	
191.6	EMPL.END.DATE	Date of termination from Stanford or leave status start date, depending on EMP.END.CODE.	P	4	Y
191.7	EMPL.END.CODE	Reason for employee separation from Stanford or leave status type.	C	2	Y
191.8	EXP.WORK.END.DT	Date of expected end of appointment or authorized work period.	P	4	
191.9	APPL.STATUS	Designates availability for job openings.	C	2	Y
191.10	APPL.SOURCE	Physical source of application (e.g., mail).	C	1	
192		*An optional segment that contains job classification data, minority status, leave, and employee group membership indicators.*			
192.1	JOB.CLASS.CODE.1	First of two possible job classification codes.	C	4	Y
192.2	PER.CENT.FTE.1	Percentage of time worked in JOB.CLASS.CODE.1.	P	2	Y
192.3	JOB.CLASS.CODE.2	Second of two possible job classification codes.	C	4	Y
192.4	PER.CENT.FTE.2	Percentage of time worked in JOB.CLASS.CODE.2.	P	2	Y
192.5	F.S.CODE	Type of work grouping for selection in various mailings, and in phone directory inclusions.	C	1	
192.6	PROF.EXP.ST.YR	Starting year of professional experience is inserted in this field.	C	2	
192.7	PATENT.AGR.CODE	This code indicates whether or not the employee has signed a patent agreement and indicates any exclusions.	C	1	
192.8	TENURE.STATUS	Tenure status of faculty members.	C	1	
192.9	EEO.CODE	Minority status code as defined by the EEOC.	C	1	Y
192.10	EEO.SUPPL.CODE	Added definition within EEO.CODE as required in Stanford Affirmative Action programs.	C	1	
192.11	ALUM.STATUS	Indicates whether or not employee has ever attended Stanford as a student.	C	1	
192.12	LV.MO.TOTAL	Total number of months of leave from Stanford since EMPL.START.DATE.	P	2	
192.13	LAST.ACT.TYPE	Last type of action against basic employee data.	C	1	Y
192.14	LAST.EFF.DATE	Date of last action against basic employee data.	P	4	Y
192.15	AWARD.AMT	Employment-to-date amount of financial awards.	P	4	
193		*Optional segment containing federal and state tax status codes.*			
193.1	FED.WH.MARITAL	Marital status for federal tax withholding purposes.	C	1	
193.2	FED.WH.CODE	Number of taxable exemptions or special tax codes.	C	2	
193.3	FED.WH.YEAR	Year in which the federal withholding declaration was made.	C	1	
193.4	FED.WH.ADD.EX	Number of additional federal withholding amounts as specially requested by employee.	P	2	
193.5	STATE.WH.CODE	Shows whether or not the employee is taxable in California.	C	1	

SEG NO ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
193.6	STATE.WH.MARITAL	Marital status of employee for California tax purposes.	C	2	
193.7	STATE.WH.EXEMPT	Number of exemptions claimed for California tax purposes.	P	2	
193.8	SOC.SEC.STATUS	Social Security tax status.	C	2	Y
194		*An optional segment containing insurance program enrollment indicators and eligibility factors.*			
194.1	RETIREMENT.CODE	Type of retirement plan participation.	C	1	Y
194.2	LIFE.INS.CODE	Level of group life insurance coverage.	C	1	Y
194.3	ACCID.INS.CODE	Number of family members insured under the accidental death and dismemberment policy.	C	1	Y
194.4	UNEMPL.DIS.CODE	Basic eligibility for unemployment compensation and disability insurances.	C	1	Y
194.5	HEALTH.INS.CODE	Medical plan enrollment and whether dependents are covered or not.	C	1	Y
194.6	MAJ.MED.CODE	Enrollment in major medical plan.	C	1	Y
194.7	GIFT.INDICATOR	Participation in payroll deduction programs for charities and gifts.	C	1	
194.8	PRESS.DIS.CODE	Enrollment in special disability program for members of press work group.	C	1	
194.9	AUTO.INS.CODE	Enrollment in automobile insurance program.	C	1	
194.10	CRED.UNION.CODE	Type of employee interaction with Stanford Credit Union.	C	1	
194.11	CAMPUS.FAC.CODE	Employee participation in Stanford recreation association and faculty club.	C	1	
194.12	CAMPUS.LIV.CODE	Shows commitments related to living on Stanford lands.	C	1	
194.13	SU.INDEBT.CODE	Indicates whether or not employee has a loan outstanding from Stanford.	C	1	
194.14	TAX.SHELTER.CODE	Enrollment in any tax shelter plan other than under the Prudential or TIAA-CREF retirement plans.	C	1	
194.15	SPEC.PAY.CODE	Indicates whether or not employee has had a special one-time payment.	C	1	
194.16	ROOM.BOARD.CODE	Code indicating whether or not the employee is paying board and/or room charges to Stanford.	C	1	
194.17	TIAA.LIFE.MISC	Shows participation in special TIAA life insurance program, or if had miscellaneous payment to Stanford.	C	1	
194.18	UNION.DED.CODE	This field will show if deductions are made to pay for union dues.	C	1	
194.19	OTHER.DED.CODE	Indicates whether or not deductions are made which are not categorized in this segment.	C	1	
194.20	LTD.INDICATOR	Specific eligibility for Stanford's long term disability program and California unemployment and disability insurance plans.	C	1	Y
194.21	WORK.COMP.CODE	Eligibility code for Workmen's Compensation program.	C	2	Y
194.22	DEPENDENT.TOTAL	Number of actual dependents related to employee.	P	2	Y
195		*Optional segment which contains codes designating Stanford student's terminal graduate status, and undergraduate class year or graduate major field. Also shows eligibility for tuition-grant program benefits.*			
195.1	TERM.GRAD.CODE	Indicates whether or not employee is classified as a terminal graduate at Stanford.	C	1	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
195.2	ENTL.TU.GR	Shows if employee is entitled to tuition-grant program benefits.	C	1	
195.3	CLASS.MAJOR.CODE	Class year if employee is an undergraduate Stanford student, or the major field designation if employee is a Stanford graduate student.	C	3	
196		*An optional segment which holds bank identification and employee account number for direct salary deposits.*			
196.1	BANK.DEP.BRANCH	Branch identification number of employee's bank where the net salary is to be deposited automatically.	P	4	
196.2	BANK.DEP.ACCT	Employee's bank account number is recorded in this field.	P	6	
196.3	BANK.DEP.ABA	The ABA number of the employee's bank is inserted in this field for automatic deposit plan purposes.	P	3	
197		*Optional recurring segment used only when Social Security Number requires correction. Contains date of change, old or new number and code indicating which.*			
197.1	SSN.CH.TYPE	Code indicating whether the Social Security Number in the SSN.CH.NO is the obsolete one or the new number.	C	1	
197.2	SSN.CH.NO	Obsolete or new Social Security Number for the employee depending upon SSN.CH.TYPE.	P	5	
197.3	SSN.CH.DATE	Date of Social Security Number change.	P	4	
198		*Optional recurring segment holding detailed salary or wage data needed for paying employee. One segment is generated for each account number used.*			
198.1	PP.CODE	Indicates type of Permanent Pay item.	C	2	Y
198.2	PP.START.DATE	Date that pay recorded in this segment is scheduled to start.	P	4	
198.3	PP.STOP.DATE	Date that the pay in this segment is scheduled to stop.	P	4	
198.4	PP.ACCT.NO	Account number being charged for the pay item.	C	7	Y
198.5	PP.ACCT.GL.CODE	Expenses classification code relating to the work performed. It should be noted that the last three positions of this code are the first three positions of the job classification code.	C	5	
198.6	PP.FIN.RPT.CODE	Financial reporting category corresponding to the expense classification code in use.	C	5	
198.7	PP.ACT.TYP.CODE	Type of action resulting in the creation of the Permanent Pay item.	C	1	
198.8	PP.PERCENT	Percentage of full time equivalency assigned to the Permanent Pay item.	P	2	
198.9	PP.STATUS	Status of the Permanent Pay item, such as "DO" for salary Distribution Offset.	C	2	
198.10	PP.AMT.RATE	The salary amount or hourly rate.	P	4	
199		*An optional recurring segment containing detailed deduction information for insurance plans and other programs. One segment is generated for each type of deduction.*			
199.1	DED.CODE	Specifies the deduction reason or insurance program.	C	2	Y
199.2	DED.START.DATE	Start date for the deduction item.	P	4	
199.3	DED.STOP.DATE	Contains the stop date related to the deduction item.	P	4	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
199.4	DED.STATUS.CODE	Information relating to the amount contributed by Stanford towards payment for benefit programs.	C	2	
199.5	DED.AMOUNT	The amount of the deduction to be taken.	P	4	
200		*Optional segment holding vacation and sick leave balances determined annually.*			
200.1	VAC.BAL.DATE	Date of the last balancing of vacation accrued less vacation taken.	P	4	
200.2	VAC.BALANCE	Contains balance of vacation accrued less vacation taken.	P	4	Y
200.3	SICK.LV.BAL.DATE	Date of the last balancing of sick leave accrued less sick leave taken.	P	4	
200.4	SICK.LV.BALANCE	The balance of sick leave accrued less sick leave taken is maintained in this field.	P	4	Y
201		*Optional segment which contains annual accumulations of gross salary, taxable income and taxes deducted for various federal and state programs.*			
201.1	YTD.GROSS.SALARY	Gross dollar total of all salary for calendar year.	P	4	
201.2	YTD.FED.WH.BASE	Total dollars taxable for federal withholding for calendar year.	P	4	
201.3	YTD.FED.WH.TAX	Total dollars withheld from salary for federal income tax for calendar year.	P	4	
201.4	YTD.SOC.SEC.BASE	Total dollars taxable for Social Security tax for calendar year.	P	4	
201.5	YTD.SOC.SEC.TAX	Total dollars withheld from salary for Social Security tax for calendar year.	P	4	
201.6	YTD.STATE.BASE	Total dollars taxable for California income tax for calendar year.	P	4	
201.7	YTD.STATE.TAX	Total dollars withheld from salary as California income tax for calendar year.	P	4	
201.8	YTD.SDI.BASE	Total dollars base for State Disability Insurance for calendar year.	P	4	
201.9	YTD.SDI.AMT	Total dollars withheld for State Disability Insurance for calendar year.	P	4	
201.10	YTD.UCI.BASE	Total dollar base for Unemployment Compensation Insurance for calendar year.	P	4	
202		*An optional segment containing quarterly accumulations of gross salary, taxable income and taxes deducted for various federal and state programs.*			
202.1	QTD.GROSS.SALARY	Gross dollar total of all salary for current calendar quarter.	P	4	
202.2	QTD.FED.WH.BASE	Total dollars taxable for federal withholding for calendar quarter.	P	4	
202.3	QTD.FED.WH.TAX	Total dollars withheld from salary for federal income tax for calendar quarter.	P	4	
202.4	QTD.SOC.SEC.BASE	Total dollars taxable for Social Security tax for calendar quarter.	P	4	
202.5	QTD.SOC.SEC.TAX	Total dollars withheld from salary as Social Security tax for calendar quarter.	P	4	
202.6	QTD.STATE.BASE	Total dollars taxable for California income tax for calendar quarter.	P	4	
202.7	QTD.STATE.TAX	Total dollars withheld from salary as California income tax for calendar quarter.	P	4	
202.8	QTD.SDI.BASE	Total dollar base for State Disability Insurance for calendar quarter.	P	4	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
202.9	QTD.SDI.AMT	Total dollars withheld for State Disability Insurance for calendar quarter.	P	4	
202.10	QTD.UCI.BASE	Total dollar base for Unemployment Compensation Insurance for calendar quarter.	P	4	
203		*Optional segment holding annual accumulations of hours worked and taken as time off for various reasons.*			
203.1	YTD.HRS.REG	Cumulative total for calendar year of hours worked at regular hourly pay.	P	3	
203.2	YTD.HRS.OVRTIME	Cumulative total for calendar year of hours worked at "overtime" pay.	P	3	
203.3	YTD.HRS.COMP	Cumulative total for calendar years of hours due as compensatory time off.	P	3	
203.4	YTD.HRS.VAC	Cumulative total for calendar year of vacation hours taken.	P	3	
203.5	YTD.HRS.SICK.LV	Cumulative total for calendar year of sick leave hours taken.	P	3	
203.6	YTD.HRS.PRCNT	Cumulative regular hours worked as a percentage of regular hours available for work.	P	3	
204		*An optional segment which contains accumulations for the last payroll period of hours worked and taken as time off for various reasons.*			
204.1	LAST.HRS.REG	Total hours worked at regular hourly pay during last payroll period.	P	3	Y
204.2	LAST.HRS.OVRTIME	Total hours worked at "overtime" pay during last payroll period.	P	3	
204.3	LAST.HRS.COMP	Total hours due as compensatory time off for hours worked during last payroll period.	P	3	
204.4	LAST.HRS.VAC	Total vacation hours taken during last payroll period.	P	3	
204.5	LAST.HRS.SICK.LV	Total sick leave hours taken during last payroll period.	P	3	
204.6	LAST.HRS.PRCNT	Regular hours worked in last payroll period as a percentage of regular hours available for work.	P	3	
205		*Optional segment containing account numbers associated with charges for Stanford living areas and food services.*			
205.1	RM.ACCT.NO	Account number associated with charge for Stanford living area.	C	7	
205.2	BD.ACCT.NO	Account number associated with charge for Stanford food services.	C	7	
206		*An optional recurring segment holding employee retirement program data including annual and employment-to-date contributions. One segment is generated for each type of retirement program in which the employee enrolls.*			
206.1	RET.PL.CONTRACT	Contract number of retirement program.	C	8	
206.2	RET.PART.DATE	Date on which the employee entered the retirement plan.	P	4	
206.3	RET.CREF.SPLIT	Percentage of contributions allocated to TIAA.	P	2	
206.4	RET.YTD.BASE.AMT	Total amount of employee contributions to the base plan (Prudential or TIAA) for the year.	P	4	
206.5	RET.YTD.CREF.AMT	Holds the total amount of employee contributions to CREF for the year.	P	4	
206.6	RET.YTD.SU.AMT	Total calendar year contributions to retirement plan made by Stanford.	P	4	
206.7	RET.PLAN.CODE	Code designates specific type of retirement plan.	C	2	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
206.8	RET.SU.TOTAL	Total Stanford contributions made to the retirement plan.	P	5	
206.9	RET.BASE.TOTAL	Total contributions to the base retirement plan.	P	5	
206.10	RET.CREF.TOTAL	Total contributions to CREF.	P	5	
207		*Optional segments containing payroll check and preprinted Personnel Action Form routing codes and dates on which information was last printed on forms.*			
207.1	PR.CHK.RTE	Campus address code where payroll check or direct bank deposit slip is to be delivered.	P	2	Y
207.2	PA.FORM.RTE	Campus address code where the computer printed Personnel Action form for employee is to be delivered.	P	2	Y
207.3	LAST.PAID.DATE	Payroll period date when employee was last paid.	P	3	
207.4	PR.INF.CD.DATE	Date on which last Payroll Information form was printed.	P	4	
207.5	PR.INF.CD.INDX	Flag set during end-of-pay-period processing which indicates requirement for subsequent Payroll Information form printing.	C	1	
207.6	PA.FORM.PRNT.DT.	Date on which last Personnel Action form was printed.	P	4	
207.7	PA.FORM.PRNT.IND	Flag set during end-of-pay-period processing which indicates requirement for subsequent Personnel Action form printing.	C	1	
208		*An optional recurring segment which contains a working title and department code for use in preparing the Faculty/Staff Directory. A maximum of three segments may be generated.*			
208.1	WORK.DEPT.CODE	Campus address code for department where employee is assigned administratively. The code is also used in generating department name in annual Faculty/Staff Directory.	P	2	Y
208.2	WORK.TITLE	Working title of employee used in Faculty/Staff Directory.	C	21	
209		*An optional segment holding a work location and associated telephone numbers which are used in preparing the Faculty/Staff Directory.*			
209.1	WORK.LOCATION	Building name and room number where employee's principal work is located.	C	20	
209.2	PHONE.BUS.EXT	Phone extension number at Stanford.	P	3	
209.3	PHONE.OTHER.BUS	Phone number of work location if not central Stanford number.	P	4	
210		*Optional recurring segment containing visa information for employee of foreign nationalities.*			
210.1	VISA.TYPE	Code indicating the type of visa issued to the employee.	C	2	
210.2	VISA.DATE	Date that the visa was issued.	P	4	
210.3	VISA.CITIZEN	Country of which employee is citizen.	C	2	
211		*Optional segment which contains code indicating highest educational achievement, and undergraduate and graduate studies information.*			
211.1	EDUC.LEVEL	Indicates highest level of educational achievement.	C	2	Y
211.2	EDUC.UG.YEAR	Year of undergraduate degree.	C	2	
211.3	EDUC.UG.DEGREE	Undergraduate degree code.	C	3	
211.4	EDUC.UG.MAJOR	Major area of undergraduate study.	P	3	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
211.5	EDUC.UG.INST	Code of undergraduate educational institution.	P	4	
211.6	EDUC.GR.YEAR	Year of graduate degree.	C	2	
211.7	EDUC.GR.DEGREE	Graduate degree code.	C	3	
211.8	EDUC.GR.MAJOR	Code designating major area of graduate study.	P	3	
211.9	EDUC.GR.INST	Graduate degree institution code.	P	4	
212		*An optional segment which holds current military status information.*			
212.1	MILIT.CODE	Indicates status of employee in relation to U.S. military service.	C	2	
212.2	MILIT.DISCH.DATE	Date of military discharge.	P	3	
213		*An optional recurring segment containing employment history prior to applying for a Stanford position. Each segment generated is for a single previous job.*			
213.1	PREV.EMPL.TYPE	Type of business engaged in previous to Stanford employment.	C	2	
213.2	PREV.EMPL.SALARY	Salary of previous position.	P	4	
213.3	PR.EMPL.LV.CODE	Code designating employee's reason given for leaving previous employment.	C	2	
213.4	PREV.EMPL.JCC	Stanford job classification code approximating work performed category in previous position.	C	4	
213.5	PREV.EMPL.ZIP	Zip code of previous employer's business address.	C	5	
213.6	PREV.EMPL.ST.DT	Date that employee started work for previous employer.	P	4	
214		*Optional recurring segment holding employee leave dates, reason and status. One occurrence per leave.*			
214.1	LV.MO.TOTAL	Total number of months that the employee has been on this leave.	P	2	
214.2	LV.STATUS	Designates the current leave status of the employee.	C	1	Y
214.3	LV.REASON.CODE	Indicates type of leave and general reason for absence	C	2	
214.4	LV.START.DATE	Date on which the most recent leave was started.	P	4	
214.5	LV.EXP.RET.DATE	Date on which employee is expected to return from leave.	P	4	
214.6	LV.ACT.RET.DATE	Date on which employee actually returned from most recent leave.	P	4	
215		*An optional recurring segment containing name, birthdate and relationship code for employee's dependent. One occurrence per dependent.*			
215.1	DEPENDENT.NAME	Full name of a family dependent.	C	23	
215.2	DEPENDENT.REL	Indicates relationship with employee, e.g., son, daughter, etc.	C	1	Y
215.3	DEP.BIRTH.DATE	Birthdate of the dependent.	P	4	
216		*Optional segment holding summarized monthly salaries: base, supplement and gross. Also contains date by which employee's salary should be reviewed.*			
216.1	BASE.MO.SALARY	Total base monthly salary for payroll groups 2 and 3. Amount paid previous month for payroll group 4.	P	4	
216.2	SUPPL.MO.SALARY	Total supplementary salary, as for BASE.MO.SALARY.	P	4	

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
216.3	TOTAL.MO.SALARY	BASE.MO.SALARY and SUPPL.MO.SALARY.	P	4	
216.4	NEXT.REV.DATE	Date by which the employee's salary or rate of pay should be reviewed.	P	4	Y
217		*An optional recurring segment holding gross salary for each quarter of calendar year. One occurrence per year with maximum of two occurrences.*			
217.1	PREV.QTD.YR	Year of quarterly gross salaries recorded in this segment.	C	2	
217.2	PREV.QTD.GROSS.1	Gross salary for first quarter of year coded in PREV.QTD.YR.	P	4	
217.3	PREV.QTD.GROSS.2	Gross salary for second quarter of year coded in PREV.QTD.YR.	P	4	
217.4	PREV.QTD.GROSS.3	Gross salary for third quarter of year coded in PREV.QTD.YR.	P	4	
217.5	PREV.QTD.GROSS.4	Gross salary for fourth quarter of year coded in PREV.QTD.YR.	P	4	
218		*Optional recurring segment containing salary and job classification history data. One occurrence generated for each change in salary, job classification or percentage of time worked. A maximum of six occurrences will be allowed.*			
218.1	SH.START.DATE	Starting date of salary history data in this segment.	P	4	
218.2	SH.STOP.DATE	Date when some change of salary history data caused creation of this segment.	P	4	
218.3	SH.ACT.TYPE.1	First Action Type code recorded which impacted salary history data.	C	1	
218.4	SH.ACT.TYPE.2	Second Action Type code recorded which impacted salary history data.	C	1	
218.5	SH.DEPT.CODE	Code of Stanford organization to which employee is administratively responsible	P	2	
218.6	SH.JCC.1	First job classification code assigned to employee prior to creation of the salary history record.	C	4	
218.7	SH.PRCNT.1	Percentage of full time associated with first job classification.	P	2	
218.8	SH.JCC.2	Second job classification code assigned to employee prior to creation of the salary history record.	C	4	
218.9	SH.PRCNT.2	Percentage of full time associated with second job classification code.	P	2	
218.10	SH.BASE.MO.SAL	Base monthly salary at the time of salary history segment creation.	P	4	
218.11	SH.SUPPL.MO.SAL	Salary history supplementary monthly salary.	P	4	
218.12	SH.PR.GRP	Payroll group at time of salary history.	C	1	
219		*An optional segment which holds information on new position of terminating employee.*			
219.1	TERM.NEW.JCC	Stanford job classification code assigned to a new position of terminating employee.	C	4	
219.2	TERM.NEW.SALARY	Salary attached to new position of terminating employee.	P	4	
219.3	TERM.NEW.JOB.ZIP	Contains zip code of business location where terminating employee is intending to work.	C	5	
219.4	TERM.EMPL.TYPE	Type of business at new position for terminating employee.	C	2	
220		*Optional segment containing record of applicant referrals and results of interviews.*			

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
220.1	APPL.REJ.REASON	Indicates the reason why an applicant was rejected for an open position, as specified by the department representative.	C	2	Y
220.2	APPL.REQ.NO	Number of the personnel requisition submitted for the open position.	P	4	Y
220.3	APPL.INTV.DATE	Date on which the job applicant was referred to a department for consideration.	P	4	
220.4	APPL.REF.SOURCE	Coded indication of how applicant found out about job opening.	C	3	
221		*An optional segment holding job skills information for applicants and employees desiring transfer or promotion.*			
221.1	TYP.SK.WPM	The number of words typed per minute in a standard typing test.	P	2	
221.2	FOR.LANG.SK.CODE	Proficiency in languages other than English is indicated by coding in this area.	C	1	
221.3	SK.CODE.1				
221.4	SK.EVAL.1				
221.5	SK.CODE.2				
221.6	SK.EVAL.2	Codes for types of skills are recorded in these four fields and evaluative ratings are inserted in the corresponding areas.	C	2,1	Y
221.7	SK.CODE.3				
221.8	SK.EVAL.3				
221.9	SK.CODE.4				
221.10	SK.EVAL.4				
222		*Optional recurring segment which contains employee claims against Stanford insurance programs. One occurrence per claim.*			
222.1	CLAIM.DATE	Date on which the employee makes claim related to insurance program or workmen's compensation.	P	4	
222.2	CLAIM.AMT	Amount of money employee claims is recorded in this field.	P	5	
222.3	CLAIM.TYPE	Insurance program under which claim was made.	C	2	Y
222.4	CLAIM.DISP	Disposition of claim by insurance vendor.	C	1	
222.5	CLAIM.PAID.AMT	Amount of money paid by insurance vendor through date in CLAIM.PAID DATE.	P	5	
222.6	CLAIM.PAID.DATE	Date of last payment to employee by insurance vendor.	P	4	
222.7	CLAIM.NO	This number is assigned within CLAIM.TYPE by insurance vendor or Stanford.	P	4	
223		*Optional non-recurring segment containing initial enrollment date for selected insured benefit plans.*			
223.1	INIT.MMED.DATE	Initial date of enrollment in major medical plan.	P	4	
223.2	INIT.HEALTH.DATE	Initial date of enrollment in health plan.	P	4	
223.3	INIT.LIFE.DATE	Initial date of enrollment in life insurance program.	P	4	
224		*Optional recurring segment holding employee records of training program need and participation.*			
224.1	TR.PROG.ID	Identification number of training program.	C	3	
224.2	TR.PROG.NEED	Code designating type of employee training need.	C	1	
224.3	TR.ST.DATE	Start date of training program.	P	4	

OASIS DATA ELEMENT DICTIONARY - EMPLOYEE FILE

SEG NO. ELEM NO.	ELEMENT NAME	DESCRIPTION	DATA TYPE	LENGTH (BYTES)	INDEXED
224.4	TR.END.DATE	Completion date of training program.	P	4	
224.5	TR.PROG.COST	Cost of training program to Stanford.	P	4	
224.6	TR.EMPL.EVAL	Employee evaluation of training program.	C	2	